Vol. 1114 Number 4

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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DEPARTMENT
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OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

May 22, 1990 Volume 1114 Number 4

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
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GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Apr. 30, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on May 19, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,665,561 through 4,667,342
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 17, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,383,335 through 4,384,368
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force

beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MARCH 11, 1990
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
Re. 33,104	07/096,920	10/31/89
(4,570,032)	(06/719,990)	(3/11/86)
4,318,221	06/261,588	3/09/82
4,318,224	06/233,620	3/09/82
4,318,326	06/220,309	3/09/82
4,318,381	06/237,991	3/09/82
4,318,419	06/216,193	3/09/82
4,318,472	06/221,348	3/09/82
4,318,546	06/244,039	3/09/82
4,318,685	06/222,711	3/09/82
4,318,839	06/227,715	3/09/82
4,318,863	06/220,632	3/09/82
4,318,891	06/230,535	3/09/82
4,318,954	06/232,426	3/09/82
4,319,045	06/240,749	3/09/82
4,574,402	06/696,914	3/11/86
4,574,403	06/552,618	3/11/86
4,574,407	06/627,206	3/11/86
4,574,410	06/622,806	3/11/86
4,574,414	06/656,276	3/11/86
4,574,416	06/636,366	3/11/86
4,574,420	06/583,437	3/11/86
4,574,421	06/666,110	3/11/86
4,574,427	06/567,750	3/11/86
4,574,431	06/672,889	3/11/86
4,574,432	06/565,695	3/11/86
4,574,441	06/591,111	3/11/86
4,574,444	06/522,702	3/11/86
4,574,445	06/633,745	3/11/86
4,574,461	06/634,604	3/11/86
4,574,464	06/534,047	3/11/86
4,574,469	06/650,964	3/11/86
4,574,477	06/638,059	3/11/86
4,574,478	06/497,484	3/11/86
4,574,480	06/529,396	3/11/86
4,574,482	06/504,316	3/11/86
4,574,484	06/674,498	3/11/86
4,574,493	06/691,408	3/11/86
4,574,504	06/616,195	3/11/86
4,574,505	06/633,296	3/11/86
4,574,506	06/582,630	3/11/86
4,574,507	06/569,797	3/11/86
4,574,508	06/513,881	3/11/86
4,574,511	06/568,379	3/11/86
4,574,512	06/495,048	3/11/86
4,574,514	06/494,892	3/11/86
4,574,517	06/517,660	3/11/86
4,574,519	06/536,765	3/11/86
4,574,520	06/663,400	3/11/86
4,574,530	06/587,823	3/11/86
4,574,532	06/660,898	3/11/86
4,574,534	06/702,334	3/11/86
4,574,551	06/613,255	3/11/86
4,574,554	06/499,226	3/11/86
4,574,562	06/729,899	3/11/86
4,574,567	06/562,585	3/11/86
4,574,568	06/644,986	3/11/86
4,574,579	06/577,512	3/11/86
4,574,583	06/619,126	3/11/86
4,574,596	06/617,682	3/11/86
4,574,597	06/632,403	3/11/86
4,574,601	06/636,875	3/11/86
4,574,602	06/535,872	3/11/86
4,574,606	06/703,607	3/11/86
4,574,611	06/743,042	3/11/86
4,574,620	06/656,589	3/11/86
4,574,622	06/593,962	3/11/86
4,574,650	06/643,013	3/11/86
4,574,653	06/573,350	3/11/86
4,574,654	06/575,057	3/11/86
4,574,657	06/557,230	3/11/86
4,574,662	06/696,757	3/11/86
4,574,663	06/606,384	3/11/86
4,574,670	06/552,692	3/11/86
4,574,672	06/671,274	3/11/86
4,574,677	06/692,642	3/11/86
4,574,679	06/563,315	3/11/86
4,574,690	06/630,377	3/11/86
4,574,691	06/587,174	3/11/86
4,574,695	06/653,581	3/11/86
4,574,698	06/630,669	3/11/86
4,574,699	06/552,650	3/11/86
4,574,702	06/539,030	3/11/86
4,574,720	06/648,785	3/11/86
4,574,723	06/691,289	3/11/86
4,574,725	06/626,940	3/11/86
4,574,731	06/687,831	3/11/86
4,574,732	06/616,862	3/11/86

Patent Number	Serial Number	Issue Date
4,574,741	06/569,318	3/11/86
4,574,743	06/578,515	3/11/86
4,574,749	06/601,985	3/11/86
4,574,752	06/660,703	3/11/86
4,574,763	06/514,774	3/11/86
4,574,764	06/734,190	3/11/86
4,574,767	06/595,465	3/11/86
4,574,773	06/638,588	3/11/86
4,574,777	06/635,232	3/11/86
4,574,783	06/671,186	3/11/86
4,574,784	06/947,188	3/11/86
4,574,791	06/574,470	3/11/86
4,574,795	06/564,504	3/11/86
4,574,796	06/663,042	3/11/86
4,574,798	06/560,336	3/11/86
4,574,799	06/503,503	3/11/86
4,574,805	06/542,278	3/11/86
4,574,806	06/656,798	3/11/86
4,574,810	06/657,949	3/11/86
4,574,816	06/575,167	3/11/86
4,574,822	06/615,465	3/11/86
4,574,831	06/474,713	3/11/86
4,574,839	06/601,780	3/11/86
4,574,841	06/652,616	3/11/86
4,574,842	06/544,409	3/11/86
4,574,847	06/691,898	3/11/86
4,574,851	06/631,186	3/11/86
4,574,852	06/614,729	3/11/86
4,574,855	06/599,793	3/11/86
4,574,861	06/540,434	3/11/86
4,574,864	06/650,092	3/11/86
4,574,865	06/668,119	3/11/86
4,574,867	06/644,524	3/11/86
4,574,874	06/482,860	3/11/86
4,574,875	06/558,025	3/11/86
4,574,877	06/585,982	3/11/86
4,574,880	06/573,083	3/11/86
4,574,893	06/644,263	3/11/86
4,574,902	06/566,148	3/11/86
4,574,907	06/587,773	3/11/86
4,574,909	06/525,536	3/11/86
4,574,911	06/666,158	3/11/86
4,574,912	06/671,207	3/11/86
4,574,916	06/748,162	3/11/86
4,574,919	06/682,306	3/11/86
4,574,921	06/654,310	3/11/86
4,574,926	06/508,406	3/11/86
4,574,933	06/601,674	3/11/86
4,574,934	06/696,338	3/11/86
4,574,935	06/591,580	3/11/86
4,574,938	06/564,738	3/11/86
4,574,942	06/560,319	3/11/86
4,574,944	06/635,553	3/11/86
4,574,947	06/649,438	3/11/86
4,574,951	06/682,150	3/11/86
4,574,955	06/655,571	3/11/86
4,574,969	06/677,741	3/11/86
4,574,972	06/730,004	3/11/86
4,574,983	06/613,910	3/11/86
4,574,988	06/581,355	3/11/86
4,574,990	06/575,143	3/11/86
4,575,002	06/602,909	3/11/86
4,575,022	06/592,556	3/11/86
4,575,028	06/625,749	3/11/86
4,575,040	06/751,562	3/11/86
4,575,042	06/642,062	3/11/86
4,575,049	06/600,330	3/11/86
4,575,050	06/421,266	3/11/86
4,575,051	06/661,138	3/11/86
4,575,067	06/679,865	3/11/86
4,575,071	06/629,334	3/11/86
4,575,078	06/627,926	3/11/86
4,575,079	06/707,382	3/11/86
4,575,080	06/604,166	3/11/86
4,574,083	06/627,544	3/11/86
4,575,088	06/370,566	3/11/86
4,575,090	06/649,603	3/11/86
4,575,091	06/656,684	3/11/86
4,575,092	06/637,736	3/11/86
4,575,094	06/578,192	3/11/86
4,575,095	06/544,518	3/11/86
4,575,096	06/621,853	3/11/86
4,575,108	06/536,676	3/11/86
4,575,112	06/604,175	3/11/86
4,575,126	06/495,856	3/11/86
4,575,127	06/692,702	3/11/86
4,575,142	06/650,119	3/11/86
4,575,149	06/581,890	3/11/86
4,575,150	06/599,789	3/11/86
4,575,155	06/588,211	3/11/86
4,575,169	06/698,922	3/11/86
4,575,177	06/537,068	3/11/86
4,575,180	06/523,325	3/11/86
4,575,192	06/540,949	3/11/86
4,575,196	06/634,155	3/11/86
4,575,197	06/674,376	3/11/86
4,575,200	06/513,334	3/11/86
4,575,204	06/514,307	3/11/86
4,575,220	06/561,534	3/11/86
4,575,226	06/713,269	3/11/86
4,575,229	06/606,512	3/11/86
4,575,236	06/642,753	3/11/86
4,575,243	06/502,990	3/11/86
4,575,246	06/586,142	3/11/86
4,575,253	06/554,551	3/11/86
4,575,258	06/637,917	3/11/86
4,575,262	06/554,488	3/11/86
4,575,266	06/669,109	3/11/86
4,575,270	06/669,650	3/11/86
4,575,275	06/610,988	3/11/86
4,575,293	06/630,223	3/11/86
4,575,300	06/620,483	3/11/86
4,575,301	06/545,044	3/11/86
4,575,313	06/651,978	3/11/86
4,575,315	06/500,178	3/11/86
4,575,327	06/465,104	3/11/86
4,575,328	06/586,855	3/11/86
4,575,335	06/677,592	3/11/86
4,575,338	06/673,822	3/11/86
4,575,339	06/621,852	3/11/86
4,575,341	06/527,027	3/11/86
4,575,343	06/232,954	3/11/86
4,575,345	06/715,729	3/11/86
4,575,346	06/525,549	3/11/86
4,575,348	06/594,534	3/11/86
4,575,349	06/700,505	3/11/86
4,575,351	06/574,073	3/11/86
4,575,354	06/507,706	3/11/86
4,575,367	06/638,070	3/11/86
4,575,371	06/738,509	3/11/86
4,575,375	06/667,575	3/11/86
4,575,377	06/650,304	3/11/86
4,575,391	06/573,177	3/11/86
4,575,398	06/393,750	3/11/86
4,575,405	06/448,056	3/11/86
4,575,407	06/664,145	3/11/86
4,575,408	06/598,549	3/11/86
4,575,422	06/446,963	3/11/86
4,575,433	06/688,553	3/11/86
4,575,441	06/587,530	3/11/86
4,575,444	06/370,556	3/11/86
4,575,458	06/427,721	3/11/86
4,575,501	06/405,847	3/11/86
4,575,505	06/634,847	3/11/86
4,575,517	06/580,902	3/11/86
4,575,528	06/585,461	3/11/86
4,575,548	06/654,471	3/11/86
4,575,555	06/656,128	3/11/86
4,575,563	06/575,734	3/11/86
4,575,578	06/455,662	3/11/86
4,575,582	06/664,066	3/11/86
4,575,586	06/626,875	3/11/86
4,575,587	06/653,626	3/11/86
4,575,588	06/660,639	3/11/86
4,575,595	06/705,866	3/11/86
4,575,607	06/555,601	3/11/86

Patent Number	Serial Number	Issue Date	4,575,717	06/558,372	3/11/86
			4,575,718	06/405,418	3/11/86
4,575,608	06/657,909	3/11/86	4,575,724	06/640,904	3/11/86
4,575,624	06/556,310	3/11/86	4,575,733	06/673,564	3/11/86
4,575,645	06/639,302	3/11/86	4,575,735	06/601,842	3/11/86
4,575,660	06/526,321	3/11/86	4,575,736	06/598,517	3/11/86
4,575,662	06/674,688	3/11/86	4,575,757	06/487,861	3/11/86
4,575,677	06/614,082	3/11/86	4,575,782	06/742,801	3/11/86
4,575,680	06/485,879	3/11/86	4,575,784	06/684,492	3/11/86
4,575,684	06/704,433	3/11/86	4,575,789	06/694,504	3/11/86
4,575,700	06/611,295	3/11/86	4,575,820	06/518,168	3/11/86
4,575,709	06/620,856	3/11/86	4,575,837	06/583,705	3/11/86
4,575,713	06/605,552	3/11/86	4,575,840	06/595,120	3/11/86
4,575,714	06/588,823	3/11/86	4,575,855	06/518,342	3/11/86

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,362,243	06/281,013	12/07/82	7/06/81	4/17/90
4,491,639	06/431,192	1/01/85	9/30/82	4/16/90

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,737,814, Re. S. N. 07/508,642, Filed Apr. 11, 1990, Cl. 354/412, ELECTRONIC MEMORY MEANS FOR ADJUSTING CAMERA ELECTRIC CIRCUITS, Yukio Nakojima, Owner of Record: *Olympus Optical Co., Ltd., Tokyo, Japan*, Attorney or Agent: Louis Weinstein, Ex. Gp.: 211

4,738,015, Re. S. N. 07/509,939, Filed Apr. 16, 1990, Cl. 29/407, INDUSTRIAL ROBOT WITH AUTOMATIC CENTERING, Hisao Kato, Owner of Record: *Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: David J. Cushing, Ex. Gp.: 326

4,766,106, Re. S. N. 07/509,017, Filed Apr. 13, 1990, Cl. 514/12, SOLUBILIZATION OF PROTEINS FOR PHARMACEUTICAL COMPOSITIONS USING POLYMER CONJUGATION, Nadine Katre, Owner of Record: *Cetus Corp., Emeryville, Calif.*, Attorney or Agent: Philip McGarrigle, Ex. Gp.: 186

4,794,248, Re. S. N. 07/507,278, Filed Mar. 22, 1990, Cl. 250/221, DETECTION DEVICE HAVING ENERGY TRANMITTERS LOCATED AT VERTICALLY SPACED APART POINTS ALONG MOVABLE DOORS, John E. Gray, Owner of Record: *Otis Elevator Co., Farmington, Conn.*, Attorney or Agent: William W. Jones, Ex. Gp.: 255

4,808,524, Re. S. N. 07/509,648, Filed Feb. 20, 1990, Cl. 435/36, TEST KIT AND METHOD FOR THE DETERMINATION OF STREPTOCOCCUS A AINTIGEN, Brian A. Snyder, et al., Owner of Record: *Eastman Kodak Co., Rochester, N.Y.*, Attorney or Agent: James L. Tucker, Ex. Gp.: 182

4,826,150, Re. S. N. 07/509,539, Filed Mar. 30, 1990, Cl. 272/73, RESISTANCE APPLYING MEANS FOR EXERCISING APPARATUS, Chihiro Minoura, Owner of Record: *Minoura Carrier & Stand Works Co., Ltd., Gifu-Ken, Japan*, Attorney or Agent: Douglas A. Miro, Ex. Gp.: 332

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,062,141, Reexam. No. 90/001,987, Requested Apr. 9, 1990, Cl.: 43/3, DECOY, Jelmer Shjeflo, Owner of Record: *M.M. & G.W. Jurgens, Fergus Falls, Minn.*, Attorney or Agent: Robert E. Kleve, Ex. Gp.: 320, Requester: CBK Ltd., Union City, Tenn.

4,369,722, Reexam. No. 90/001,985, Requested Apr. 6, 1990, Cl.: 112/103, CONTROL SYSTEM FOR A PLURALITY OF EMBROIDERY SEWING MACHINES, Kaji Nishida, et al., Owner of Record: *Aisin Seiki Kabushiki Kaisha, Aichi, Japan*, Attorney or Agent: Unknown, Ex. Gp.: 240, Requester: Owner

4,424,551, Reeexam. No. 90/001,983, Requested Apr. 3, 1990, Cl.: 361/302, HIGHLY-RELIABLE FEED THROUGH-FILTER CAPACITOR AND METHOD FOR MAKING SAME, Robert A. Stevenson, Owner of Record: *AVX Corp., New York, N.Y.*, Attorney or Agent: Sutton, Basseches, Magidoff & Amaral, Ex. Gp.: 210, Requester: Sierra Aerospace Technology Inc., Carson City, Nev.

4,433,070, Reexam. No. 90/001,986, Requested Apr. 9, 1990, Cl.: 523/171, CULTURED ONYX PRODUCTS AND METHODS THEREFOR, Gilbert B. Ross, et al., Owner of Record: *Spectrum Licensing Corp., New York. N.Y.*, Attorney or Agent: Louis J. Bachand, Ex. Gp.: 150, Requester: John W. Jones, Houston, Tex.

4,544,584, Reexam. No. 90/001,988, Requested Apr. 9, 1990, Cl.: 428/15, CULTURED ONYX PRODUCTS AND METHODS THEREFOR, Gilbert B. Ross, et al., Owner of Record: *Spectrum 21 Licensing Corp., New York. N.Y.*, Attorney or Agent: Louis J. Bachand, Ex. Gp.: 150, Requester: John W. Jones, Houston, Tex.

4,619,584, Reexam. No. 90/001,984, Requested Apr. 6, 1990, Cl.: 416/129, DOUBLE PROPELLER DRIVE FOR BOATS, Lennart Brandt, Owner of Record: *AB Volvo Penta, Gathenburg, Sweden*, Attorney or Agent: Unknown, Ex. Gp.: 340, Requester: Owner

4,657,696, Reexam. No. 90/001,981, Requested Apr. 2, 1990, Cl.: 252/301.170, SCINTILLATION COUNTING MEDIUM AND COUNTING METHOD, James Thomson, Owner of

Record: *Fisons, Plc., Ipswitch, England*, Ex. Gp.: 110, Requester: Packard Instrument Co., Inc., Downers Grove, Ill.

4,748,161, Reexam. No. 90/001,980, Requested Apr. 4, 1990, Cl.: 514/182, TRITERPENYL ESTERS OF ORGANIC ACIDS AND HYPOLIPIDEMIC AGENTS COMPOSED OF THEM, Goro Kimura, et al., Owner of Record: *Amano Pharmaceutical Co., Ltd., Nagoya, Japan*, Attorney or Agent: Wegner & Bretschneider, Ex. Gp.: 120, Requester: Owner

4,776,765, Reexam. No. 90/001,979, Requested Apr. 2, 1990, Cl.: 416/241, MEANS AND METHOD FOR REDUCING SOLID PARTICLE EROSION IN TURBINES, William J. Sumner, Owner of Record: *General Electric Co., Schenectady, N.Y.*, Attorney or Agent: J.E. Squillaro, Ex. Gp.: 340, Requester: George Vande Sande, Washington, D.C.

4,864,390, Reexam. No. 90/001,982, Requested Apr. 4, 1990, Cl.: 358/60, DISPLAY SYSTEM WITH EQUAL PATH LENGTHS, Thomas McKechnie, et al., Owner of Record: *North American Philips Corp., Tarrytown, N.Y.*, Attorney or Agent: Unknown, Ex. Gp.: 260, Requester: Owner

Patent Terms Extended Under 35 USC 156

Certificates extending the terms of the following patents were issued on April 25, 1990.

U.S. Patent No. 4,267,320, granted May 12, 1981 to Michael Gregson et al., Owner of Record: Glaxo Operations UK Ltd., Title: CEPHALOSPORIN ANTIBIOTICS, Classification: 544/22, Product Trade Name: Ceftin, Term Extended: 2 years

U.S. Patent No. 4,409,214, granted Oct. 11, 1983 to Takao Takaya, et al., Owner of Record: Fujisawa Pharmaceutical Co., Ltd., Title: 7-ACYLAMINO-3-VINYLCEPHALOSPORANIC ACID DERIVATIVES AND PROCESSES FOR THE PREPARATION THEREOF, Classification: 424/246, Product Trade Name: Suprax, Term Extended: 2 years

U.S. Patent No. 4,494,531, granted Jan. 22, 1985 to Cesare Gianturco, Owner of Record: Cook, Inc., Title: EXPANDABLE BLOOD CLOT FILTER, Classification: 128/1R, Product Trade Name: Cook Bird's Nest Vena Cava Filter, Term Extended: 459 days

Errata

"All reference to Patent No. 4,904,250 to Ingela Ternstrom of Molnlycke, Sweden for `ABSORPTION BODY INTENDED FOR DISPOSABLE ARTICLES SUCH AS DIAPERS, SANITARY NAPKINS AND THE LIKE' appearing in the Official Gazette of Feb. 27, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,917,936 to John C. Rhodes et al., of Mo. for `ABSORBENT PAD AND METHOD FOR CONSTRUCTING SAME' appearing in the Official Gazette of Apr. 17, 1990 should be deleted since no patent was granted."

PATENT NOTICES

Certificates of Correction For Week of May 22, 1990

D. 301,184	4,826,128	4,841,081	4,849,113
D. 302,074	4,826,225	4,841,148	4,849,125
4,618,622	4,826,347	4,841,310	4,849,136
4,640,319	4,826,678	4,841,699	4,849,207
4,674,108	4,826,854	4,841,905	4,849,396
4,679,560	4,827,802	4,842,875	4,849,400
4,704,548	4,827,871	4,843,056	4,849,453
4,705,831	4,827,985	4,843,197	4,850,359
4,716,856	4,828,096	4,843,211	4,850,490
4,736,125	4,828,611	4,843,404	4,850,504
4,742,279	4,829,146	4,843,566	4,850,707
4,742,806	4,831,362	4,843,790	4,850,886
4,745,355	4,832,469	4,844,427	4,850,949
4,746,234	4,832,680	4,844,939	4,851,423
4,747,130	4,833,161	4,845,056	4,851,568
4,748,158	4,833,662	4,845,146	4,851,569
4,749,576	4,833,957	4,845,279	4,851,667
4,772,983	4,834,218	4,845,411	4,851,800
4,773,206	4,834,757	4,845,522	4,851,806
4,773,936	4,835,011	4,845,658	4,851,855
4,776,064	4,835,295	4,845,726	4,852,042
4,784,465	4,835,516	4,845,943	4,852,044
4,792,411	4,835,636	4,845,976	4,852,104
4,795,925	4,835,779	4,846,168	4,852,141
4,798,793	4,835,800	4,846,185	4,852,199
4,799,151	4,836,192	4,846,549	4,852,254
4,805,376	4,836,697	4,846,669	4,852,396
4,805,901	4,836,924	4,846,696	4,852,598
4,808,625	4,836,941	4,846,905	4,853,269
4,808,658	4,837,241	4,846,924	4,853,300
4,810,783	4,837,470	4,846,931	4,853,311
4,810,896	4,837,499	4,846,957	4,853,436
4,811,278	4,837,608	4,847,254	4,853,572
4,811,362	4,837,857	4,847,449	4,854,661
4,814,598	4,838,201	4,847,702	4,854,734
4,816,474	4,838,535	4,847,712	4,855,185
4,818,062	4,838,652	4,848,146	4,855,852
4,819,050	4,838,761	4,848,199	4,861,109
4,820,001	4,838,902	4,848,201	4,861,139
4,820,201	4,839,190	4,848,320	4,861,760
4,821,463	4,839,458	4,848,327	4,861,988
4,821,570	4,839,679	4,848,434	4,863,953
4,824,065	4,839,680	4,848,664	4,868,177
4,824,160	4,839,822	4,848,735	4,837,740
4,824,582	4,840,457	4,848,742	4,877,318
4,824,720	4,840,576	4,848,920	4,879,738
4,824,964	4,840,972	4,848,978	4,894,974

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	Sunnyvale Patent Clearinghouse	(408) 730-7290
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	St. Louis Public Library	(314) 241-2288 Ext. 376
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New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
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	Toledo/Lucas County Public Library	(419) 259-5212
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	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
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PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF April 7, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-7-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	10-18-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. V. FISHER, Acting Director	5-27-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	4-5-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	2-29-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	11-9-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	3-23-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 STEWART LEVY, Acting Director	3-30-88
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-24-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	4-2-89

Expiration of patents: The patents within the range of numbers indicated below expire during April 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,723,992 to 3,729,743 inclusive
Plant Patents ..... None

REISSUES

MAY 22, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,218

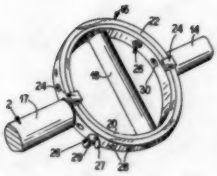
WEIGHT LIFTING BAR

Brian Twardosz, 12941 Exchange, Chicago, Ill. 60633

Original No. 4,618,143, dated Oct. 21, 1986, Ser. No. 679,869, Dec. 10, 1984. Application for reissue Apr. 25, 1988, Ser. No. 185,819

Int. Cl.[5] A63B *13/00*

U.S. Cl. 272—123 **11 Claims**



10. A device used to hold weights during human exercise comprising:

a bar with a longitudinal axis having opposed end portions receiving selectively removable weights and two spaced hand grip portions each inboard of said end portions and non-removably secured relative to each other and said end portions;

said hand grip portions each comprising:

an outer ring member secured against rotation to said bar;

a cylindrical hand grip member extending across a diameter of said ring member; and

a retaining means engageable between said hand grip member and said ring member to selectively secure said hand grip member against rotation relative to said bar member;

wherein said hand grip member can be selectively rotated relative to said bar and retain in said selected position to permit various exercises to be performed without removal of said weights from said bar.

Re. 33,219

CLAMP VALVES

Michael G. Daniell, and Gerald S. Martin, both of Auckland, New Zealand, assignors to Fisher & Paykel Limited, Auckland, New Zealand

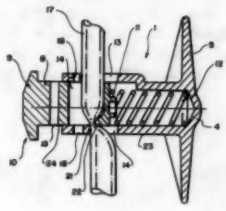
Original No. 4,634,092, dated Jan. 6, 1987, Ser. No. 656,724, Oct. 1, 1984. Application for reissue Jan. 4, 1989, Ser. No. 293,198

Claims priority, application New Zealand, Sep. 30, 1984, 205826

Int. Cl.[5] F16L *55/14*

U.S. Cl. 251—7 **5 Claims**

1. A clamp valve comprising a hollow member open at one end and having a side wall with a pair of apertures therethrough, a slide movable in said hollow member and having a transverse aperture therethrough so that a conduit having a pliable resilient wall can in use be passed through both said apertures in said wall of said hollow member and through said aperture through said slide, said aperture through said slide having an outer edge *shaped to provide a rib extending inwardly*



of said aperture and juxtaposed to an inner edge of one of the apertures in said wall for clamping said conduit between said edges, and biasing means to bias said slide relative to said hollow member to a position for clamping said conduit between said edges so that said conduit is normally closed to fluid flow.

Re. 33,220

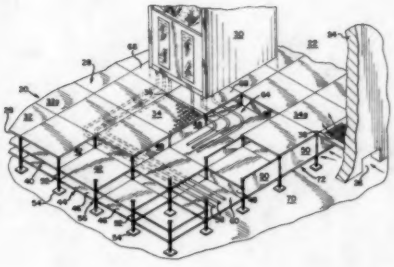
MODULAR COMBINATION FLOOR SUPPORT AND ELECTRICAL ISOLATION SYSTEM FOR USE IN BUILDING STRUCTURES

William R. Collier, Oak Brook Terrace, Ill., assignor to Interstitial Systems, Inc., Oakbrook, Ill.

Original No. 4,630,417, dated Dec. 23, 1986, Ser. No. 579,426, Feb. 13, 1984. Application for reissue Dec. 23, 1988, Ser. No. 289,615

Int. Cl.[5] E04B *2/82*

U.S. Cl. 52—263 **26 Claims**



1. A combination working area floor structure and conductor support and isolator assembly comprising, in combination, a plurality of vertically extending floor support column units each having upper and lower end portions and an intermediate column section, a working area floor positioned by and disposed in overlying relation to said upper ends of said column support units; means on at least one intermediate portion of said support columns for positioning and supporting at least one conductor support floor, said conductor support floor being disposed beneath and spaced apart from said working area floor, a plurality of vertically extending imperforate wall panels extending between portions of said conductor support

floor and said working area floor so as to subdivide the region above said conductor support floor and below said working area floor into a mechanically isolated conductor plenum adapted to receive and support insulated electrical conductors, and to afford mechanical isolation therefor, said plenum also including at least one upwardly extending opening in said working area floor through which said conductors may pass for attachment to an apparatus supported on said working area floor, with said wall panels also defining a mechanically isolated, vertically extending passage extending from beneath said conductor support floor through said isolated plenum and to said working area floor, with an under portion of said working area floor lying above said vertically extending passage and said conductor support floor also including at least one opening therein to afford communication between the area above said working area floor and the area beneath said conductor support floor.

Re. 33,221

DENTAL RESTORATIVE CEMENT PASTES

Walter E. Brown, Rockville, and Laurence C. Chow, Potomac, both of Md., assignors to American Dental Association Health Foundation, Washington, D.C.

Original No. 4,518,430, dated May 21, 1985, Ser. No. 539,740, Oct. 6, 1983. Continuation-in-part of Ser. No. 373,157, Apr. 29, 1982, abandoned. Application for reissue May 18, 1987, Ser. No. 51,739

Int. Cl.[5] **C01B** *25/32;* **C09K** *3/00*

U.S. Cl. 423—308 **18 Claims**

1. A [dental restorative] paste *consisting essentially of* [comprising] an aqueous mixture of $Ca_4(PO_4)O$ and at least one other calcium phosphate selected from the group consisting of $CaHPO_4.2H_2O$ [,] *and* $CaHPO_4$, [$Ca_8H_2(PO_4)_6.5H_2O$, β-$Ca_3(PO_4)_2$, β-$Ca_3(PO_4)_2$, and modified $Ca_3(PO_4)_2$, the paste being capable of hardening] *which aqueous mixture hardens* into a cement *at an ambient temperature.*

PLANT PATENTS

GRANTED MAY 22, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,232

LILY PLANT NAMED PENNY LANE

Petrus M. M. Hoff, Hemmerbuurt, Netherlands, assignor to Hoffgaarde B.V., Netherlands

Filed May 11, 1989, Ser. No. 350,236
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of lily plant named Penny Lane, as illustrated and described.

7,233

CHRYSANTHEMUM PLANT NAMED YELLOW COMET

Camilo Herrera, Bogota, Colombia, assignor to Whitefield Corporation, Panama

Filed Apr. 13, 1989, Ser. No. 337,425
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—78 1 Claim

1. A new and distinct Chrysanthemum plant named Yellow Comet, as described and illustrated.

7,234

POINSETTIA PLANT '135'

Franz Fruehwirth, Encinitas, Calif., assignor to Paul Ecke Ranch, Inc., Encinitas, Calif.

Filed Oct. 27, 1988, Ser. No. 263,494
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—86 1 Claim

1. A new and distinct Poinsettia cultivar, substantially as herein shown and described, distinguished by its predominantly white bracts bearing scattered red splotches, stiff-stemmed, and vigorous growth habits.

7,235

POINSETTIA PLANT 'C-27'

Franz Fruehwirth, Encinitas, Calif., assignor to Paul Ecke Ranch, Inc., Encinitas, Calif.

Filed Oct. 27, 1988, Ser. No. 263,496
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—86 1 Claim

1. A new and distinct Poinsettia cultivar, substantially as herein shown and described, distinguished by its large, bright red, erect flower bracts which tend to bend upwards.

PATENTS

GRANTED MAY 22, 1990

ERRATA

For CLASS	See PATENT NO.
047-052	4,926,597
047-061	4,926,598
049-088	4,926,599
049-491	4,926,600
051-007	4,926,601
051-135	4,926,602
051-165	4,926,603
051-165	4,926,604
055-089	4,926,620
070-374	4,926,670
072-389	4,926,676
072-430	4,926,670
072-410	4,926,685
074-527	4,926,688
074-227	4,926,711
475-227	4,926,712
475-146	4,926,713
475-337	4,926,715
119-106	4,926,784
606-088	4,926,854
606-159	4,926,858
606-144	4,926,860
128-731	4,926,969
222-520	4,927,065
224-042	4,927,066
248-539	4,927,117
248-545	4,927,118
248-555	4,927,119
248-676	4,927,120
292-201	4,927,203
292-216	4,927,204
294-094	4,927,205
455-611	4,927,226
424-004	4,927,345
600-036	4,927,410
604-088	4,927,423
209-315	4,927,534
424-449	4,927,687
549-451	4,927,968

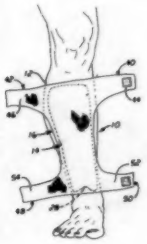
341-137 4,928,007
187-108 4,928,021
331-017 4,928,075
353-020 4,928,123
354-106 4,928,124
342-009 4,928,130
342-188 4,928,131
358-213 4,928,137
363-040 4,928,138
372-038 4,928,248
367-106 4,928,262
367-118 4,928,263
367-141 4,928,264
369-116 4,928,277
378-020 4,928,283

PATENTS

GRANTED MAY 22, 1990

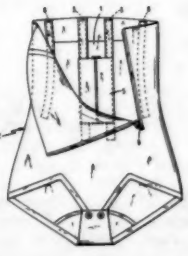
GENERAL AND MECHANICAL

4,926,501
DISPOSABLE ANTERIOR LOWER LEG GUARD
Carl C. Goosen, 2415 Shoreham Rd., Orlando, Fla. 32803
Filed Nov. 21, 1988, Ser. No. 274,350
Int. Cl.[5] A41D *13/06, 13/08*
U.S. Cl. 2—22 **3 Claims**



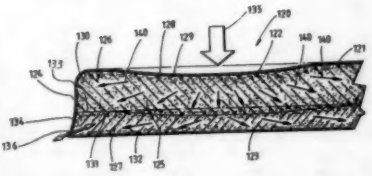
1. A disposable anterior lower leg guard to reduce injury to the anterior lower leg area of a patient comprising an inner shock absorbing protective member including an elongated outer protective panel and an elongated inner corrugated shock absorbing section, said elongated inner corrugated shock absorbing section comprising an inner shock absorbing member including a plurality of ridges and troughes disposed within an outer relatively soft enclosure including an inner and outer enclosure element cooperatively forming a pocket therebetween to receive and operatively retain said inner shock absorbing protective member therebetween to be worn over and protect the anterior lower leg area of the patient, and an upper and lower attachment means formed on the upper and lower portion of said outer relatively soft enclosure to detachably attach said disposable anterior leg guard to the anterior lower leg area of a patient, said elongated outer protective panel and said elongated inner corrugated shock absorbing section each including an arcuate concave recess formed on the lower end portion thereof to accommodate ankle and foot movement.

4,926,502
CORSET FOR ALLEVIATION OF LUMBAGO
Tetsuo Miyamura, Shiga, Japan, assignor to Wacoal Corp., Japan
Filed Jan. 9, 1989, Ser. No. 295,102
Int. Cl.[5] A41C *1/00, 1/08*
U.S. Cl. 2—44 **7 Claims**



1. A corset for alleviation of lumbago, comprising:
a non-stretchable section which is formed to be positioned at a portion which corresponds to the lumbar region in the center of the back of a human body;
stretchable portions comprising elastic core materials which are respectively connected to left and right side edges of said non-stretchable section; and
a gel pad disposed at said non-stretchable section so as to deformably fill any gap between the user's back and said non-stretchable section to provide improved back support to the user.

4,926,503
ATHLETIC SHOCK ABSORBING PAD
James C. Wingo Jr, Houston, Tex., assignor to Riddell, Inc., Chicago, Ill.
Division of Ser. No. 193,840, May 13, 1988. This application Jun. 30, 1989, Ser. No. 373,501
Int. Cl.[5] A41D *27/26*
U.S. Cl. 2—267 **4 Claims**



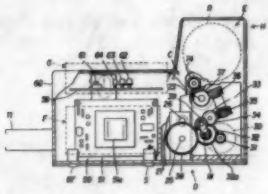
1. A shock absorbing pad structure for athletic equipment comprising:
a flexible enclosure having first and second faces and a periphery defining a cavity;
a flexible open-celled foam member is disposed within the cavity and comprises two layers of open-celled foam, the density of the layers of open-celled foam being different from one another, each layer of the foam member having two faces, one face of each layer being bonded to one face of the flexible enclosure, and each layer of open-celled foam having a periphery disposed adjacent the periphery of the flexible enclosure, the cells of the foam member releasably holding a volume of air selectively varied between first and second volumes differing by a volume differential in response to application and removal of a force on the shock absorbing pad structure, said volume differential being transferred between the foam member and the atmosphere outside the shock absorbing pad structure through at least one air permeable region of the periphery of the flexible enclosure.

4,926,504
TOILET SEAT STRUCTURE CAPABLE OF AUTOMATICALLY FEEDING A SEAT COVERING PAPER ONTO A TOILET SEAT
Mitsuhiro Higuchi, and Hirofumi Yamamoto, both of Kitakyushu, Japan, assignors to Toto Ltd., Kitakyushu, Japan
Filed May 23, 1988, Ser. No. 197,531
Claims priority, application Japan, May 28, 1987, 62-134531; Aug. 22, 1987, 62-208537; Oct. 28, 1987, 62-165962[U]; Dec. 18, 1987, 62-322571
Int. Cl.[5] A47K *13/20*
U.S. Cl. 4—247 **2 Claims**

1. A toilet seat structure which comprises:
(a) a toilet seat body having an upper surface;
(b) a functional casing provided at the rear of the toilet seat body;
(c) a paper roll storage box disposed in the functional casing at an upper portion thereof and rotatably stored in the

storage box a paper roll having a length of paper sufficient for being cut into a plurality of seat covering papers, the paper having a free end beginning with which the paper is unreelable from the roll;

(d) a paper feeding mechanism for feeding paper in a forward direction toward said toilet seat body by unreeling the paper from the paper roll and extending the paper forwardly onto the upper surface of the toilet seat body, said paper feeding mechanism being disposed in the functional casing immeddiately below the storage box, said paper feeding mechanism including a feed roller and a press roller biased together to form a nip through which the paper is conducted from the paper roll, the feed roller and the press roller being so arranged that the paper before entering said nip travels on a substantial portion of the surface of the press roller in a direction opposite the direction of winding of the paper on the paper roll to offset curl imparted to the paper by the roll so that the paper is flat when extended onto said upper surface of the seat body;



(e) a paper cutting mechanism disposed in the functional casing in front of the paper feeding mechanism, said paper cutting mechanism being located to cut the paper at a position a predetermined distance rearwardly away from the free front end of the paper to provide a flat piece of seat covering paper on the toilet seat body;

(f) a control unit comprising a central processing unit for accurately controlling the operation of the paper feeding mechanism and the paper cutting mechanism to feed a specified length of the paper onto the toilet seat body and cut the paper fed onto the toilet seat body to provide a seat covering paper on said toilet seat body; and

(g) a control board for transmitting control signals to the control unit.

4,926,505

TOILET SEAT STRUCTURE CAPABLE OF AUTOMATICALLY FEEDING SEAT COVERING PAPER ON TOILET SEAT

Mitsuhiro Higuchi; Hirofumi Yamamoto, both of Kitakyushu; Osamu Yamamoto, Kasugai; Shokichi Fujii, Kasugai, and Katsumi Nonomura, Kasugai, all of Japan, assignors to Toto Ltd., Kasugai, Japan

Filed Nov. 14, 1988, Ser. No. 271,134

Claims priority, application Japan, Nov. 20, 1987, 62-294476; Aug. 3, 1988, 63-195131

Int. Cl.[5] A47K *13/18*

U.S. Cl. 4—247 **28 Claims**

1. A toilet seat structure capable of automatically feeding a seat covering paper onto a toilet seat comprising:

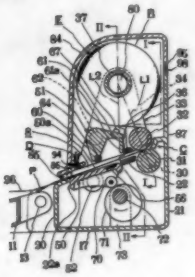
(a) a seat covering paper roll in a seat covering paper roll protection cover disposed at the rear end of a toilet seat body,

(b) a seat covering paper feeding mechanism for feeding a seat covering paper from said seat covering paper roll to the upper surface of the seat body,

(c) a seat covering paper tearing mechanism for tearing said seat covering paper after said feeding of said seat covering paper and

(d) a control unit for controlling said seat covering paper feeding mechanism and said seat covering paper tearing mechanism,

said toilet seat structure further comprising tension applying means comprising first clamping means and second clamping means disposed below said seat covering paper roll in a spaced-apart manner in a feeding direction, said tension applying means being capable of applying a tension to a



portion of said seat covering paper reeled out from said seat covering paper roll which bridges between said first and second clamping means, and said seat covering paper tearing mechanism comprising a press plate disposed between said first and second clamping means, said press plate being capable of applying pressure on said tensioned portion of said seat covering paper for tearing said seat covering paper.

4,926,506

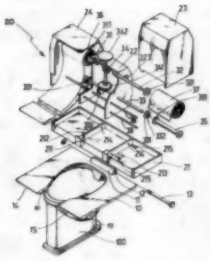
SANITARY LAVATORY SEAT SYSTEM

Grande Wang, No. 255, Dong Ming Road, Tali Shiang, Taichung, Taiwan

Filed Aug. 1, 1988, Ser. No. 226,861

Int. Cl.[5] A47K *3/18*

U.S. Cl. 4—247 **8 Claims**



1. A sanitary lavatory seat system comprising:

a lavatory seat having two generally flat portions and having a protruding portion at the rear thereof, said lavatory seat being positioned above a lavatory bowl;

a casing positioned at the rear of a lavatory bowl, said casing being solely mounted to said protruding portion and said lavatory bowl whereby said sanitary lavatory seat system is free-standing on the lavatory bowl, said lavatory seat being pivotally attached about said protruding portion to said casing whereby said lavatory seat can be raised against said casing, said casing further having a bottom holder, a middle holder and two side covers cooperating with said bottom holder to provide an encloses space on each side of said middle holder;

a wheel axle within each of said two side covers for receiving rolls of covering material;

a take-up wheel axle extending from said middle holder into said two side covers and positioned beneath said wheel axle, each of said rolls having a terminal end which is extended out of a bottom slot of the casing, over the top of one of the generally flat portions of the lavatory seat, deflected around a front edge of the generally flat portion, extended under the generally flat portion, returned into the casing and wound around the take-up wheel axle;

a pair of fixed guide rods within each of the two side covers, one of the pair of rods guiding the covering material leaving the casing through the slot and the other of the pair of rods guiding the covering material returning to the casing to be wound around said take-up wheel, said one pair of at guide rods being positioned beneath said wheel axle; and

drive means positioned within said middle holder for rotating the take-up wheel axle to synchronously slide the covering material over the lavatory seat for a fixed length to thereby cover the two generally flat portions of the lavatory seat and to present a clean and sanitary portion of the covering material upon each activation of the drive means;

each of said wheel axles, said take-up wheel axle, said pair of fixed guide rods and said drive means all being located within said enclosed space of said casing whereby said covering material can assuredly remain clean until moved out of said casing and over the top of the generally flat portions of the lavatory seat by said drive means and whereby damage to said wheel axles, take-up wheel axle, guide rods and drive means can be avoided further comprising a wheel hub positioned on said take-up wheel axle for each of said rolls and a driving wheel fixedly attached on said take-up wheel axle of each of said wheel hubs, said driving wheel being rotatable with said take-up wheel axle and having a groove therein for receiving a portion of the wheel hub to lock the hub therewith whereby said wheel hub will be rotated with said take-up wheel axle, each of said wheel hubs being longitudinally slidable along said take-up wheel axle to facilitate replacement of the covering material.

4,926,507

ADJUSTABLE DRAIN CLOSURE

Burnie M. Craig, Laguna Beach, and Roy K. Fujitaki, Altadena, both of Calif., assignors to American Brass and Aluminum Foundry Co., Inc., Los Angeles, Calif.

Filed Aug. 9, 1989, Ser. No. 390,025
Int. Cl.[5] A47K *1/14*; E03C *1/26*
U.S. Cl. 4—295 **13 Claims**

1. In a drain closure, the combination comprising:

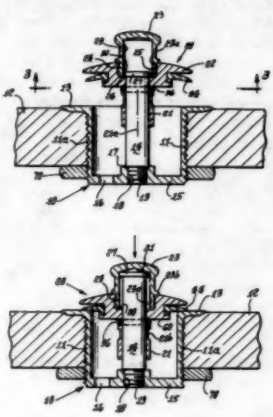
(a) a drain stopper having a downwardly projecting sleeve,

(b) an upwardly extending post loosely received in said sleeve, and means carrying the post,

(c) the sleeve having at least one opening through the side thereof,

(d) and a spring carried by the sleeve and having an arm received in said opening to frictionally engage the post,

(e) whereby the sleeve, spring and stopper are adjustably movable up and down relative to the post, against frictional force exerted by the spring arm engaging the post as the arm slides relative to the post,

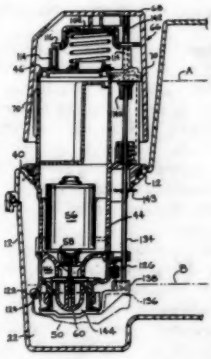


4,926,508

PORTABLE TOILET WITH BATTERY OPERATED FLUSH ASSEMBLY

Charles L. Sargent; John M. Antos, and Scott I. Biba, all of Ann Arbor, Mich., assignors to Thetford Corporation, Ann Arbor, Mich.

Continuation of Ser. No. 114,081, Oct. 27, 1987. This application Feb. 10, 1989, Ser. No. 309,844
Int. Cl.[5] E03D *1/24*
U.S. Cl. 4—329 **10 Claims**



1. In a portable toilet which includes a seat section having a bowl with a bottom discharge opening and a chamber containing flush water for rinsing said bowl and flushing the contents thereof through said discharge opening, pump means operable to move water from said flush water chamber into said bowl, an enclosure for said pump means having a lower flush water inlet communicating with said flush water chamber, electric motor means drivingly connected to said pump means, battery means mounted on said seat section, means for selectively electrically connecting said battery means to said motor means, said electrical connecting means including a circuit having an "on/off" switch and further including a switch actuating member movably mounted on said seat section for movement be-

tween two positions corresponding to "on" and "off" positions of said switch, closure means for said flush water inlet movable between open and closed positions, said closure means in the closed position blocking flow of flush water from said chamber into said enclosure and then into said bowl and said closure means in the open position enabling flow of flush water from said chamber into said enclosure, and means operable in response to movement of said actuating member to said position corresponding to the "on" position of said switch for moving said closure means to said open position.

4,926,509

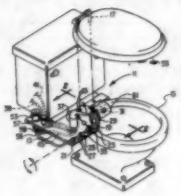
BIDET

Joyce H. Bass, 2405 Arbor Oaks Dr., Arlington, Tex. 76006

Filed Jul. 21, 1988, Ser. No. 222,132

Int. Cl.[5] A61H *35/00*

U.S. Cl. 4—448 **21 Claims**



1. A bidet apparatus adapted to be fitted to a toilet including a bowl having an upper horizontal rim surface, which comprises:

a base plate attachable to said upper horizontal rim surface;

a spray pipe pivotally mounted to said base plate about a horizontal axis, said spray pipe having an inlet and an outlet and sized and shaped to be movable between a retracted position adjacent said rim surface and an in use position extending toward the center of said bowl;

a spray nozzle connected to the outlet end of said spray pipe;

a crank arm connected to said spray pipe to pivot said spray pipe about said horizontal axis between said retracted and in use positions;

a valve mounted to said base plate adjacent to and horizontally displaced from said crank arm, said valve having an outlet and at least one inlet, said valve having a lever handle pivotable about a horizontal axis between a valve open position and a valve closed position by said lever handle,

said valve being operative to selectively control the rate of flow of water passing through the bidet apparatus, said rate of flow being selectable in response to linear movement of said lever handle;

conduit means for connecting said outlet of said valve to said spray pipe;

and a link pivotally connected between said lever handle of said valve and said crank arm, whereby movement of said lever handle to said valve open position pivots said spray pipe to said in use position; wherein

said spray pipe is curved such that movement of said lever handle to change the rate of flow does not appreciably change the direction of the spray exiting said spray nozzle while said spray nozzle is in said in use position.

4,926,510

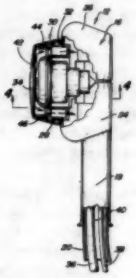
HAND HELD DRY HYDRO-MASSAGE UNIT FOR A SPA

Jonathan Watkins, Vista, Calif., assignor to Watkins Manufacturing Corporation, Carlsbad, Calif.

Filed Oct. 24, 1988, Ser. No. 261,943

Int. Cl.[5] A61H *9/00*; E04H *3/18*

U.S. Cl. 4—542 **15 Claims**



1. A hand held dry hydro-massage unit for applying dry hydro-massage to specific portions of a user's body, said unit associated with a spa tub having a water and an air supply, said dry hydro-massage unit comprising:

a rigid housing having a front opening;

a hydro-massage jet assembly having a discharge nozzle mounted within said housing, said hydro-massage jet assembly supplying a massaging fluid mix of air and water through said discharge nozzle;

means fluidly connecting said hydro-massage jet assembly to the water and air supply of the tub for the supply of water and air to said hydro-massage jet assembly; and

a diaphragm sealingly covering said opening of said housing whereby said massaging fluid mix of air and water from said discharge nozzle massagingly flexes said diaphragm;

means for restricting outlet flow of discharged fluid from said housing thereby increasing the fluid pressure within said housing to expand and maintain said diaphragm in a substantially constant inflated state beyond said front opening so as to provide a pillow-like surface to contact the user, said discharge jet discharging fluid into the pressurized fluid environment and against said expanded diaphragm,

said dry hydro-massage unit manually manipulable such that said diaphragm covered discharge nozzle may be selectively positioned against specific portions of the user's body.

4,926,511

MOVABLE SHOWER ASSEMBLY HAVING AN AUTOMATICALLY RETRACTING HOSE AND A SHOWER HEAD CAPABLE OF TAKING UP MULTIPLE POSITIONS

Alain Coll, 10 rue des Albatros, 77200 Croissy Beaubourg, France

Division of Ser. No. 54,563, May 27, 1987, abandoned. This application Oct. 24, 1988, Ser. No. 262,044

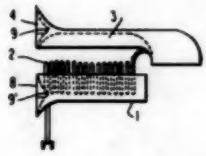
Claims priority, application France, Jun. 6, 1986, 86 08223

Int. Cl.[5] A47K *3/22*

U.S. Cl. 4—605 **6 Claims**

1. A shower assembly, comprising: a support (1) having a semi-cylindrical housing, a hose (2), and a hand manipulable shower head (3) having at least one concave surface in the form of a sector of a cylinder, wherein said hose is of round or shaped cross section and is wound helically to constitute a helical spring shape, wherein said shower head and said support together constitute a housing for at least partially enclos-

ing said hose when retracted and wherein the shower head comprises an elongate hand grip portion followed by a water outlet nozzle, an outlet end of the hose being coupled to the



shower head proximate an interface region between the hand grip portion and the nozzle, and the length of the support being approximate that of the hand grip portion.

4,926,512

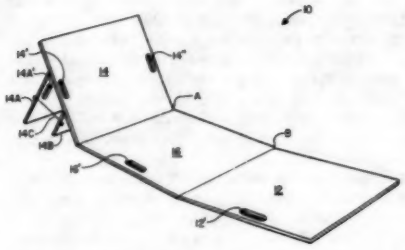
FOLDING PAPERBOARD BEACH CHAIR

Brian D. Coyle, 205 Get-a-Way La., Bahama, N.C. 27503

Filed Nov. 28, 1989, Ser. No. 442,144

Int. Cl.[5] A47C *7/16*

U.S. Cl. 5—417 **6 Claims**



1. A folding paperboard chair scored and cut to form a beach chair or the like, said chair comprising:

an elongated paperboard body having two spaced-apart and transversely extending score lines which define a bottom leg support panel, a middle seat support panel, and a top back support panel, said bottom and top panels being adapted to fold upwardly and over said middle panel so as to overlay same for ease of carrying said chair in a closed configuration;

a plurality of spaced-apart, foldable support panels extending transversely across the back of said top back support panel to provide support for said top panel when said chair is in an open configuration and which are adapted to fold upon and overlay said top panel when said top panel is folded to overlay said middle panel; and

an aperture defined by each of said bottom, middle and top panels and adjacent to one side thereof so as to be in registration and thereby to form a carrying handle when said chair is in a closed configuration and said top and bottom panels overlay said middle panel.

4,926,513

APPARATUS FOR CHANGING DISPOSABLE BEDDING ON A MATTRESS

Edwin O. Oats, Dallas, Tex., assignor to Roll-in-Sheet Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 279,973, Dec. 5, 1988, abandoned. This application Jun. 28, 1989, Ser. No. 372,326

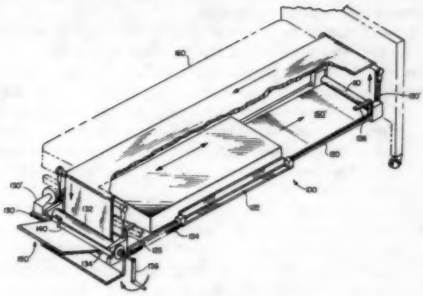
Int. Cl.[5] A47C *21/00*

U.S. Cl. 5—488 **2 Claims**

1. The combination, with a bed having a mattress, and disposable bedding sheets in tension contact with the top surface of a mattress, comprising:

A. a bedding storage carton for storage of folded increments of bedding sheets that are folded to some fractional width of the mattress, commensurate with the width of the storage carton;

B. means supported by the bed to control tension relationship of the storage carton means, by tension springs and to rollably guide multiple increments of bedding sheets;



C. said bedding sheets comprising at spaced intervals, a topmost sheet and a lowermost sheet, said sheets being of substantially the same width, said sheets also having longitudinal edges folded upon themselves;

D. means mounted on the bed, opposite the means supported by the bed to control tension and to advance portions of multiple increments of said bedding into and out of registry with the mattress of said bed; and

E. means to sever used portions of the disposable bedding.

4,926,514

METHOD OF AND APPARATUS FOR REMOVING STAINS FROM SOILED AREAS OF A PLANNAR TEXTILE ARTICLE

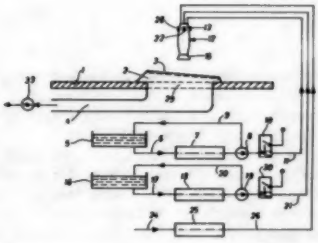
Hans Leuenberger, Bottighofen, Switzerland, assignor to Blac Holding AG, Kreuzlingen, Switzerland

Filed Jan. 18, 1989, Ser. No. 299,474

Claims priority, application Switzerland, Jan. 18, 1988, 163/88; May 20, 1988, 1926/88

Int. Cl.[5] D06B *1/02, 5/24*

U.S. Cl. 8—150 **26 Claims**



1. A method of removing stains from a soiled area of a planar textile article, comprising the steps of

placing a soiled area of a planar textile article in a stretched condition over a water and air penetratable support;

mechanically working said soiled area at least once by a jet consisting essentially of relatively highly pressurized liquid by directing said jet against said soiled area such as to cause said relatively highly pressurized essentially liquid jet to penetrate therethrough, whereby dirt which caused

the staining is torn away from said stained area and is dragged along by said relatively highly pressurized essentially liquid jet; and

immediately thereafter exposing said area to a jet consisting essentially of pressurized air such as to have the pressurized essentially air jet penetrate therethrough, whereby liquid is expelled and driven away from said area by the force of the pressurized essentially air jet and an immediate drying thereof is reached.

17. An apparatus for removing stains from a soiled area of a planar textile article, comprising

a water and air penetratable support intended for supportingly receiving a soiled area of a textile article;

at least one means for producing and discharging a jet consisting essentially of relatively highly pressurized liquid directed against the soiled area of the textile article stretched over said support whereby dirt which caused the staining is torn away from said area and is dragged along by said relatively highly pressurized essentially liquid jet;

a means for producing and discharging a jet consisting essentially of pressurized air directed against said area of such textile article placed onto said support whereby liquid is expelled and driven away from said area by the force of the pressurized essentially air jet and an immediately drying thereof is reached.

4,926,515

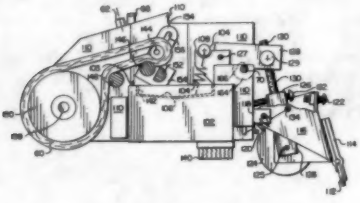
IMPROVED MOPPING SYSTEM

William R. Lynn, P.O. Box 1074, Dover, N.H. 03820, and Roger R. Belanger, 11 1/2 Hamilton St., Dover, N.H. 03820

Filed Mar. 3, 1987, Ser. No. 21,339

Int. Cl.[5] A47L *11/14*

U.S. Cl. 15—4 **6 Claims**



1. An improved mopping system for use in cleaning a surface comprising in combination:

a mopping assembly comprising handle means;

means for containing a dispensable liquid;

a floor cleaner apparatus having a top surface, and, a bottom surface positioned adjacent which, for contacting the surface to be cleaned, is a rotatable means for absorbing liquid from the surface to be cleaned; said rotatable absorbent means having means for removing liquid therefrom which has been absorbed from the surface to be cleaned and reservoir means, separate from the container means, associated with said removing means, for storing liquid removed from said rotatable absorbent means;

means for attaching said container means to said mopping system;

means for dispensing fresh liquid from the container means onto the surface to be cleaned; and

means for fastening said handle means to the top surface of the floor cleaner apparatus.

4,926,516

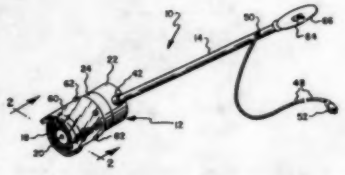
FLOOR CARE APPARATUS

Russell Valvo, P.O. Box 1, 144 Lake St., Angola, N.Y. 14006

Filed Oct. 14, 1988, Ser. No. 258,030

Int. Cl.[5] A47L *11/18*

U.S. Cl. 15—49 C **6 Claims**



1. Floor care apparatus capable of removing chewing gum or the like; from flooring such as carpets or the like, the floor care apparatus comprising:

a housing having a generally cylindrical non-rotatable portion a segment of which is disposed upon the flooring when the housing is in an operative position, the housing being rockable to an inoperative position;

an electric motor mounted within the housing, the motor having an arbor shaft which extends beyond one side of the housing, the motor being mounted in such a manner that the arbor shaft is generally parallel to the surface of the flooring when the housing is in an operative position;

a wire brush mounted on the arbor shaft beyond one side of the housing, the periphery of the wire brush engaging the surface of the flooring when the housing is in an operative position and the periphery of the wire brush not engaging the surface of the flooring when the housing is rocked to an inoperative position;

a control handle having one end rigidly interconnected with said generally cylindrical portion of the housing and mounted so that it is generally perpendicular to the axis of the arbor shaft, the other end of the control handle being provided with a hand grip or the like, the handle being capable of the causing the housing to be rocked between its operative and inoperative positions;

power line means to power up the electric motor to cause the wire brush to be rotated, at least a portion of the power line means extending through the control handle; and

a clear shield having an edge portion mounted on the cylindrical portion of the housing, which clear shield extends beyond one side of the housing above the wire brush when the floor care apparatus is in an operative position.

4,926,517

SWEEPER

Keith E. Smith, 1612 S. Combee Rd., Lakeland, Fla. 33801

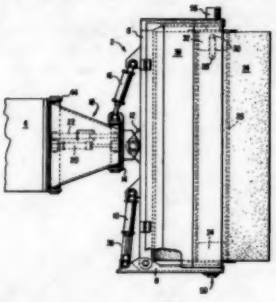
Filed Feb. 24, 1989, Ser. No. 315,300

Int. Cl.[5] E01H *1/02*

U.S. Cl. 15—82 **10 Claims**

1. Sweeping apparatus comprising support means for supporting a brush for rotation about a generally horizontal axis and means for mounting said support means on a vehicle, wherein said support means comprises first and second arms, means for moving said first arm with respect to said second arm between a first position wherein said first arm is spaced from said second arm by a distance such that said brush is received between said arms and a second position wherein said first arm is spaced from said second arm such that said brush is released from between said arms, drive means mounted on said first arm by universal joint means for engaging one end of said

brush and for rotating said brush about an axis extending between said first and second arms, and idler means mounted on



said second arm by universal joint means for engaging an opposite end of said brush.

4,926,518
PLASTIC DRAIN AUGER

Erwin F. Mikol, Park Ridge, Ill., assignor to Twentieth Century Companies, Inc., Wheeling, Ill.

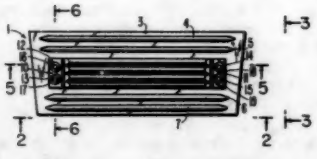
Filed Jul. 15, 1988, Ser. No. 219,956
Int. Cl.[5] B08B 9/02
U.S. Cl. 15—104.33 7 Claims

1. An elongated, generally cylindrical auger disposed about a central axis, said auger adapted to be used for cleaning pipes and tubes, said auger comprising of a plastic material, said auger having a continuous core concentrically positioned about said central axis, the outer surface of said auger being a helical coil shape, concentrically positioned about said central axis, said helical coil shape being defined by closely spaced ribs separated by notches, said ribs being sufficiently close to limit the flexing of said auger.

4,926,519
TROWEL

Daniel B. Podlesny, New Brunswick, and Ralph Lopez, Cliffwood Beach, both of N.J., assignors to Red Devil, Inc., Union, N.J.

Filed Apr. 10, 1989, Ser. No. 335,846
Int. Cl.[5] B05C 17/10
U.S. Cl. 15—235.4 11 Claims



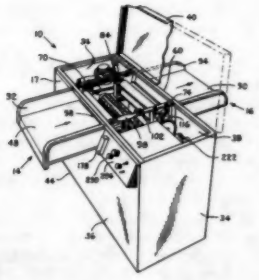
1. A plastic trowel comprising:

a substantially flat blade;
a smooth lower side on said blade;
an upper side on said blade;
a curved handle;
a first handle-retaining means on said upper side near a first end of said blade;
a second handle-retaining means on said upper side near a second end of said blade;
an arcuate handle;
a first end portion extending from a first end of said handle;
a second end portion extending from a second end of said handle;
first engagement means on said first end portion for engaging said first handle-retaining means;
second engagement means on said second end portion for engaging said second handle-retaining means;
said first handle-retaining means including a first member passing through said first end portion;
a first upset on said first member above said first end portion, whereby said first end portion is firmly affixed to said blade;
said second handle-retaining means including a second member passing through said second end portion; and
a second upset on said second member above said second end portion, whereby said second end portion is affixed to said blade.

4,926,520
METHOD AND APPARATUS FOR CLEANING CARPET TILES

Claude F. Watson, 19 Harvest La., Greenville, S.C. 29601

Filed Jul. 31, 1987, Ser. No. 80,429
Int. Cl.[5] A47L 11/00
U.S. Cl. 15—302 6 Claims



1. A subassembly for a carpet tile cleaning machine having a scrubbing device for scrubbing carpet tiles, such subassembly comprising:

a reservoir adapted for holding a fluid, said reservoir having inlet means adapted for allowing a fluid to be introduced therein, and outlet means comprising separate wetting outlet means and rinsing outlet means integral with reservoir and adapted for allowing a fluid to be discharged therefrom, respectively;
wetting means connected to said wetting outlet means and adapted for wetting a carpet tile with at least a fluid from said reservoir prior to the carpet tile being scrubbed by a scrubbing device of a carpet tile cleaning machine;
rinsing means connected to said rinsing outlet means and adapted for rinsing a carpet tile with a fluid from said reservoir after the carpet tile is scrubbed by a scrubbing device of a carpet tile cleaning machine;
pump means adapted for pumping fluid from said wetting and rinsing outlet means to said wetting means and said rinsing means, respectively;

drainage means associated with said wetting means and said rinsing means, said drainage means being adapted for receiving fluid emitted by said wetting means and said rinsing means;

vacuum means for vacuuming fluid from a carpet tile after the carpet tile has been subjected to rinsing fluid from said rinsing means;

a vacuumed fluid container connected to said vacuum means for receiving the fluid vacuumed from a carpet tile, said vacuumed fluid container being connected to said drainage means for allowing removal of the fluid therefrom through said drainage means; and

vacuum pump means connected to said vacuumed fluid container and said vacuum means for drawing a vacuum in said vacuumed fluid container and said vacuum means.

4,926,521

ERGONOMIC HANDLE FOR A KITCHEN ARTICLE

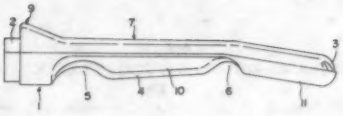
Didier Gagnepain, Tournus, France, assignor to Terraillon, societe anonyme, Annemasse, France

Filed Aug. 23, 1988, Ser. No. 236,021

Claims priority, application France, Sep. 8, 1987, 87 12659

Int. Cl.[5] A47J 45/06

U.S. Cl. 16—110 A **8 Claims**



1. A handle for a kitchen article, comprising an elongate body ending in a first attachment end providing connection of the handle with the kitchen article body and in a second free end, its lower face comprising a first transverse groove, with rounded edges, disposed at a small distance from the first end of the handle, wherein:

the first transverse groove has a section adapted for engagement of a finger of the user,

the handle comprises a second transverse groove with rounded edges, spaced apart from the first transverse groove in the direction of the second end of the handle, for engaging a finger of the user,

the spacing between the first and second transverse grooves is from about 7 to about 9 cm,

said handle having a substantially constant cross-section between the free end and the second transverse groove,

said handle comprising a first handle section between the second transverse groove and the first handle end and a second handle section between the second groove and the second handle end, the first and second handle sections forming an acute angle with respect to each other.

4,926,522

UTILITY TOOLS

Wei Wang, 3757 16th Ave. S., Minneapolis, Minn. 55407

Filed Apr. 18, 1989, Ser. No. 340,135

Int. Cl.[5] B25G 1/04, 3/24

U.S. Cl. 16—114 R **11 Claims**

11. A utility tool for use with utility workheads having screwing attachment chambers and for utility workheads that are conventional held in the hand of the user comprising:

a utility handle, said utility handle including a first tubular section and a second tubular section located in telescoping arrangement with one another to permit a user to lengthen or shorten the tubular sections with respect to one another to thereby permit the user to lengthen or shorten said utility handle;

an extender for attaching to one end of said first tubular section, said extender having a female thread on one end for engaging the first end of said tubular section and a male thread on the opposite end to permit said extender to be connected to various utility workheads, said extender including a female thread on said opposite end to connect to an adaptor; and

an adaptor, said adaptor having means for engaging said first tubular section and a housing having a chamber for receiving and holding a utility workhead that is normally

held in a users hand, said means including a cylindrical chamber having a thumbscrew with one end extending partially across said cylindrical chamber to engage the utility workhead that is normally held in the users hand by tightly sandwiching the utility workhead in the chamber between the end of said thumbscrew and a portion of said cylindrical chamber so that said utility workhead is firmly held in said cylindrical chamber.

4,926,523

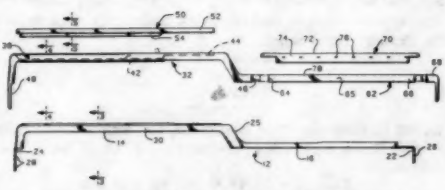
DOOR HANDLE OF A HOUSEHOLD REFRIGERATOR

James R. Carlson, and Joseph D. Tobbe, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Jul. 3, 1989, Ser. No. 375,571

Int. Cl.[5] E05B 1/00; A47B 95/02; B65D 25/28

U.S. Cl. 16—125 **5 Claims**



1. A door handle assembly of a household refrigerator comprising:

a stiffener member having an elongated body made of rigid metal in the shape of an upwardly open channel with a base and two legs and having a first section offset from a second section to act as the gripping section and having spaced apart apertures, said stiffener member having means at each end for securement to a refrigerator door, said first section having a molded soft elastomeric covering on the outside and having apertures in alignment with the apertures in the stiffener member;

a first decorative trim member having an inner side with a contour to receive the legs of the channel of the first section of the stiffener member and side walls overlapping the upper edge of the legs and elastomeric covering, said

trim member having an open upwardly facing recess area in the outer side with apertures in alignment with the apertures in the stiffener member and having a terminal end portion;

an elongated metal plate dimensioned to be nested in the recess area of the decorative trim member and having threaded fastener receiving means in alignment with the apertures in the decorative trim member and stiffener member;

a second decorative trim member with an upwardly open channel surrounding the base and both legs of the channel of the second section and having one end secured to the terminal end portion of the decorative trim covering the first section and the other end secured to a trim end cap secured to the means for securing the stiffener member to the refrigerator door;

a downwardly open channel shaped member having a base and two legs, said legs being located between the legs of the upwardly open channel decorative trim member and the legs of the second section of the stiffener member; and

threaded fastener means through the apertures into the fastener receiving means in the elongated metal plate to rigidly assemble the components together as a subassembly for installation on a refrigerator door.

4,926,524

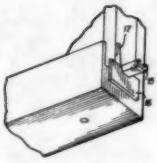
WINDOW PIVOT CORNER

George W. Owens, 233 Dove Av., Sebring, Fla. 33870

Filed Aug. 31, 1987, Ser. No. 91,742

Int. Cl.[5] E05D *15/22*

U.S. Cl. 16—386 11 Claims



1. A corner pivot for mounting in a sash of an associated window hung between side rails of a window frame to permit tilting of the window, comprising in a molded, single-piece, unitary body (a) an attaching portion having a wall with a first bore therethrough for receiving a first screw, the attaching portion being received within the sash of the associated window; (b) a lug unitary with the single-piece, unitary body and extending in a direction perpendicular to the wall of the attaching portion, the lug having a second bore therethrough opening in a direction substantially perpendicular to that of the bore through the wall for receiving a second screw that extends substantially perpendicular with respect to the first screw; and (c) a projecting pivot pin unitary with the molded, single-piece, unitary body and extending therefrom in a direction substantially parallel with the wall of the attaching portion for engagement with the adjacent side rail of the window frame for permitting tilting as well as sliding of the window, wherein a molded, unitary, single-piece corner pivot with a projecting pivot pin is provided, which corner pivot is retained in the sash by a first screw received in the bottom wall and a second screw received through the lug.

4,926,525

ARRANGEMENT FOR FASTENING POCKET CLIPS TO TUBULAR PARTS OF WRITING INSTRUMENTS

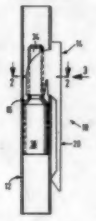
Dieter Eylers, Idar-Oberstein, Fed. Rep. of Germany, assignor to Gottlieb Roll GmbH & Co., Idar-Oberstein, Fed. Rep. of Germany

Filed Sep. 13, 1989, Ser. No. 406,685

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1988, 8811733

Int. Cl.[5] B43K *25/00*

U.S. Cl. 24—11 F 6 Claims



1. In combination:

a tubular part of a writing instrument, such as a ball-point pen casing, fountain pen cap or the like, said tubular part having a substantially rectangular opening in a circumferential wall thereof, and having an open end; a pocket clip having a tongue stamped from metal band material and made relatively stiff with an upper end flexibly fastened to the tubular part and a lower end urged resiliently against the tubular part, said upper end having two tab-like material sections passed through the substantially rectangular opening into the interior of the tubular part having free end portions lying in the interior of the tubular part, the tab-like material sections being bent arcuately contrariwise with concave sides facing one another in a plane at right angles to the longitudinal central axis of the tubular part; and a locking component circular in diameter and inserted into the tubular part from the open end, said bent end portions engaging with bias the locking component and permitting a resilient rocking up of the bottom end of the tongue, in an intermediate area each tab-like material section having a slot open at a lower end and running substantially parallel to the pocket clip, for permitting a resilient springing open of the end portions of the tab-like material sections adjoining the slots, within the tubular part.

4,926,526

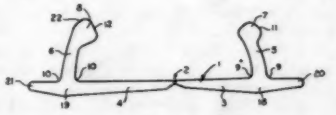
REUSABLE BAG CLOSURE

Christine C. Brown, 30001 Golden Lantern #204, Laguna Niguel, Calif. 92667, and Dennis G. Brown, P.O. Box 458, Lemon Grove, Calif. 92045

Continuation of Ser. No. 531,427, Sep. 12, 1983, abandoned. This application Jan. 13, 1986, Ser. No. 817,780

Int. Cl.[5] B65D *33/16, 77/10*

U.S. Cl. 24—30.5 R 21 Claims



1. A reusable closure of the type used for holding sheets of pliable material together, comprising a one-piece elongate

member molded from a plastics material, the member being formed with a reduced thickness live hinge line extending along its length, substantially straight leg portions being defined on opposite sides of said live hinge line which are movable towards and away from each other about said live hinge line, said leg portions each having an upstanding ear extending along their lengths, the areas joining said leg portions and ears being rounded, said ears having interengageable locking portions at their free edges which are adapted to snap releasably into locking engagement when said leg portions are urged towards each other;

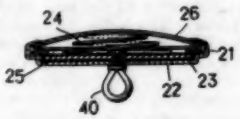
said locking portions comprising lips, one of said lips being of arcuate cross section and having a slanted flat face and the other lip being of substantially circular cross section and having a rounded face positioned so as to initially engage said flat face through sheets of pliable material disposed therebetween when said leg portions are urged towards each other and to slide over said slanted flat face into said locking position, whereby the sheets of pliable material are clamped between said interengaged locking portions to hold the sheets together, each of said ears curving arcuately towards each other at an angle of less than 90 degrees so that when in a closed position, the closure is substantially formed into an A-shape with the ears comprising the base of the A, thereby the closure to close and clamp the closure onto sheets of pliable material for clamping the sheets of pliable material together.

4,926,527

ORNAMENTAL BUTTON

Jinichi Sekiguchi, Tokyo, Japan, assignor to Meikho Industry Corp., Ltd., Tokyo, Japan

Filed Aug. 2, 1989, Ser. No. 388,466
Claims priority, application Japan, Apr. 11, 1989, 1-89610
Int. Cl.[5] A44B *1/18*
U.S. Cl. 24—90 A **3 Claims**



1. In an ornamental button adapted to be sewn on a clothing, furniture or the like by a thread which has passed through a thread attachment ring provided on the bottom of said button and having a thread guide eye, characterized by:

(1) a main body including:

a back seat plate having a circular flat bottom provided with an arcuate guide slot adjacent to the peripheral edge and a holding hole extending radially outwardly from the center of said bottom and terminating at an enlarged diameter leading end;

an operation seat plate rotatably disposed on said bottom of the back seat plate and provided with an operation projection adjacent to the periphery of said operation seat plate to fit in said guide slot and an operation hole extending radially outwardly from the center of the operation seat plate and terminating at an enlarged diameter leading end to be align with or displaced from said holding hole in the back seat plate during the rotation of said operation seat plate; and

a spring disposed on said bottom of the back seat plate for urging said operation seat plate against said bottom of the back seat plate and

(2) a thread attachment ring detachably attached to the back of said main body and including:

a stopper having such a diameter allowed to be inserted via said enlarged diameter ends of the holding and operation holes into said holding and operation holes when the two holes align with each other but not to be allowed to be inserted into the holding and operation holes via the inner ends of said holding and operation holes having a diameter smaller than that of said enlarged diameter leading ends;

a neck having such a thickness allowed to be inserted even in said smaller diameter inner ends of the holding and operation holes and attached said stopper thereto,

an attachment portion secured to one end of said neck; and

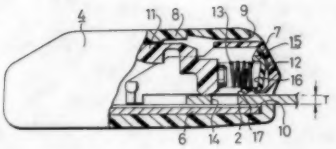
a thread guide eye connected to the other end of said neck to guide a thread therethrough.

4,926,528

BUCKLE FOR SEAT BELT SYSTEM

Masuo Matsuki, Chigasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 14, 1989, Ser. No. 407,041
Claims priority, application Japan, Sep. 21, 1988, 63-122765[U]
Int. Cl.[5] A44B *11/26*
U.S. Cl. 24—640 **5 Claims**



1. In a buckle for a seat belt system, said buckle including:

a buckle base;

a buckle button provided movably in parallel with the length of the buckle base, adapted to move a buckle latch piece upon parallel movement thereof and defining in association with the buckle base a clearance through which an associated tongue plate may be inserted into the buckle;

a cover defining an opening through which a portion of the buckle button is selectively movable back and forth and enclosing therein the buckle button and buckle base except for a surface area of the buckle button, said surface area being exposed through the opening; and

a button spring provided between the cover and the buckle button for applying a spring force against the buckle button in a direction to push out the buckle button,

the improvement wherein the buckle button is provided with a tiltable member which has a seat portion receiving an outer end portion of the button spring thereon and a suppressing portion projecting into the clearance from the seat portion.

4,926,529

TENTER FRAME APPARATUS AND METHOD

Christopher E. Hosmer, Taylors, S.C., and John F. Whaley, Warwick, R.I., assignors to Marshall and Williams Company, Providence, R.I.

Filed Sep. 15, 1988, Ser. No. 244,300
Int. Cl.[5] D06C *3/02, 3/10;* B21L *53/10*
U.S. Cl. 26—89 **16 Claims**

1. The method of fabricating a lubrication free tenter for processing sheet material including a chain having a pin and steel bushing carried thereon opposite a tender rail comprising the steps of:

press fitting a molded bushing liner constructed of low friction wear resistant polyimide resin or the like plastic material stable at high temperatures into said steel bushing; and

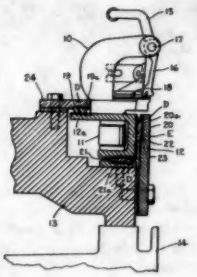
then axially boring said bushing liner while press fitted into the steel bushing increasing the size of the opening therein

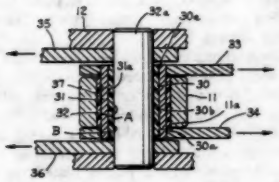
to accommodate the pin and minimize the thickness of the liner;

whereby breakage of the bushing liner during boring is avoided while minimized thickness thereof reduces stretching of the chain due to compression of the liner resulting from tensioning of the chain.

9. A lubrication free tenter for processing sheet material including a chain having a pin and steel bushing carried thereon opposite a tentar rail comprising:

a press fitting molded bushing liner constructed of low





friction wear resistant polyimide resin or the like plastic material stable at high temperatures in said steel bushing; and

an axial bore in said bushing liner machined therein while said bushing liner is press fitted into the steel bushing increasing the size of the opening in said liner to accommodate the pin and minimize the thickness of the liner;

whereby breakage of the bushing liner during boring is avoided while minimized thickness thereof reduces stretching of the chain due to compression of the liner resulting from tensioning of the chain.

4,926,530

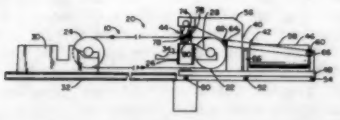
METHOD FOR MANUFACTURING NEEDLED FELTS HAVING MACHINE DIRECTION ORIENTED FIBERS

Peter P. Stanislaw, Bennington, Vt., assignor to Morrison Berkshire, Inc., North Adams, Mass.

Filed Dec. 11, 1987, Ser. No. 131,996

Int. Cl.[5] D04H 5/02

U.S. Cl. 28—111 **7 Claims**



1. A method of manufacturing endless needled felts having at least one layer of longitudinally-extending spiral windings of a fiber web, said method comprising the steps of:

providing a first machine having first support means for supporting an endless fabric and for moving a fabric supported thereon in a longitudinal direction of said first machine, said first machine having in association therewith a web feeding device for feeding a fiber web having a width substantially less than the working width of said first machine and tacking means operatively associated with said web feeding device for tacking fiber web applied to an endless fabric supported on said first machine, and said first machine having no separate full-width needling means which is operable to perform full-width needling of an endless fabric supported on said first machine;

providing a second machine having second support means for supporting an endless fabric and for moving a fabric supported thereon in a longitudinal direction of said second machine, said second machine including full-width needling means for needling a fabric supported on said second support means, said full-width needling means being disposed to extend in a direction transverse to said longitudinal direction of said second machine and having a working width corresponding to the working width of said second machine, and said second machine having no web feeding device for feeding onto an endless fabric supported on said second machine longitudinally extending spiral windings of a fiber web which has a width substantially less than the width of endless felts to be produced;

placing an endless fabric on said first support means and operating said first machine to move said endless fabric in said longitudinal direction of said first machine;

while said endless fabric is being moved in said longitudinal direction of said first machine, reciprocating said web feeding device throughout the working width of said endless fabric so as to apply overlapping longitudinally extending spiral windings of said fiber web on said endless fabric;

operating said tacking means as said web feeding device is reciprocated so that said tacking means tacks said fiber web applied to said endless fabric substantially only throughout the width of said applied fiber web;

removing from said first machine said endless fabric having said fiber web tacked thereto;

placing said removed endless fabric having said tacked fiber web onto said second support means of said second machine and operating said second machine to move said endless fabric placed thereon in said longitudinal direction of said second machine; and

operating said full-width needling means of said second machine as said fabric is being moved in said longitudinal direction of said second machine to fully needle said tacked fiber web to said endless fabric.

4,926,531

APPARATUS FOR GIVING PROTECTION FROM DRAFT AND DUST AT A WINDING MACHINE

Gerhard Koslowski, Uzwil, and Manfred Bollen, Oberuzwil, both of Switzerland, assignors to Benninger AG, Uzwil, Switzerland

Filed Jan. 11, 1989, Ser. No. 299,546

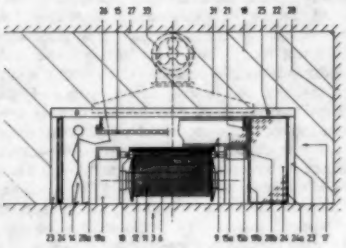
Claims priority, application Switzerland, Jan. 22, 1988, 224/88

Int. Cl.[5] D02H 11/00

U.S. Cl. 28—173 **12 Claims**

1. A winding installation comprising a bobbin creel, a winding machine including a beam for winding on an array of yarns applied from said bobbin creel and a portal-like support construction mounted outside said bobbin creel and over said winding machine with clearance, said support construction extending with respect to width and height beyond said winding machine and substantially parallel to the axis of said beam and said support construction including wall portions that

substantially close off said clearance between said support construction and said winding machine thereby giving protection when said winding machine is in operation from draft and dust arising as a result of said operation.



4,926,532

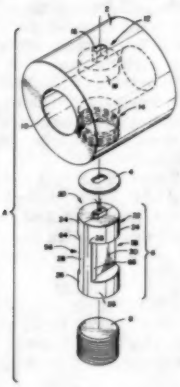
METHOD OF MANUFACTURING A FLOW METER

Jackie M. Phipps, 1337 Rutherford Dr., Mesquite, Tex. 75149, and Ronald B. Barrier, 15505 Lea Valley Circle, Dallas, Tex. 75248

Division of Ser. No. 56,886, Jun. 3, 1987, Pat. No. 4,854,177. This application May 3, 1989, Ser. No. 346,794

Int. Cl.[5] H01L *41/22*

U.S. Cl. 29—25.35 **7 Claims**



1. A method of manufacturing a flow meter comprising the steps of:

(a) providing first and second body members each having inner and outer surfaces;

(b) forming a first recess extending transversely from the inner surface of said first body member through only a portion thereof thereby forming a first sensing surface;

(c) associating a first sensing means with said first recess and communicating with said first sensing surface; and

(d) securing said first body member to said second body member.

4,926,533

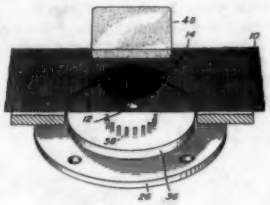
PAPER-MAKING WIRE REPAIR KIT

Jean Couture, 4025 Courcelles St., Jonquière, Quebec, Canada (G8A 1B6)

Filed Nov. 8, 1988, Ser. No. 268,540

Int. Cl.[5] B23D *19/00*

U.S. Cl. 29—33 F **7 Claims**



1. An apparatus for use with U-shaped staples of substantially same dimensions and consisting of a bight and of two legs, said apparatus destined to fix a patch onto a face of a paper-making pulp dewatering wire to cover a perforation of said wire and comprising:

a base plate;

a plurality of staple-ejecting plungers fixed to, and upstanding from, said base plate,

a pusher plate disposed over said base plate, having a wire-contacting face and having through-bores slidably receiving said plungers,

biasing means to move said pusher plate from a retracted to an advanced position, spaced from said base plate,

stop means to stop said pusher plate at said advanced position under the bias of said biasing means, and

guide means to guide said pusher plate during its movement between said retracted and said advanced position; and wherein the stroke of said pusher plate from its retracted to its advanced position is at least equal to the length of a staple, such in said advanced position, a stapler inserted in a through-bore and contacting the plunger therein, does not protrude from said wire-contacting face of said pusher plate, and in its retracted position, the end of said plunger is at least flush with said wire-contacting face.

4,926,534

METHOD FOR MANUFACTURING A POPPET VALVE HEAD

Herbert Windelbandt, Aachen, Fed. Rep. of Germany, assignor to Sempell Armaturen GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 155,121, Feb. 10, 1988, abandoned. This application May 9, 1989, Ser. No. 349,919

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1987, 3704948; European Pat. Off., Jul. 14, 1987, 87110122.6

Int. Cl.[5] B21K *1/22*

U.S. Cl. 29—888.451 **4 Claims**

1. A method of manufacturing a poppet valve member having a stem portion and a poppet disk, comprising the following sequence of steps:

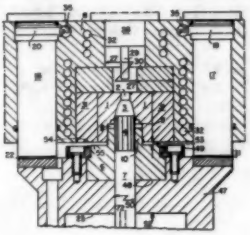
(a) using a single finish forming die means of hard metal having a first stem forming cavity, a second widened stem forming cavity, and a third poppet disk forming cavity,

(b) heating and cutting to length a work piece blank, then

(c) first extrusion pressing and simultaneously guiding said heated and cut blank in such a way that said first and second stem cavities must be filled to form said stem portion prior to any filling of said poppet disk cavity, and then immediately in the same finish forming die means,

(d) upset pressing without any further extrusion said heated and extrusion pressed blank for only now filling said third poppet disk cavity, whereby said stem portion is formed first by extrusion pressing and said poppet disk is formed

next by upset pressing and all three cavities of said finish forming die means are filled in one uninterrupted operation in a single work cycle and in the same work station to avoid repositioning of said work piece blank.



4,926,535

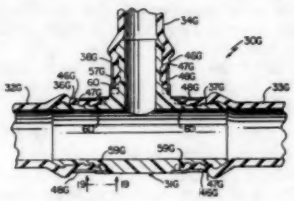
BRANCHED HOSE CONSTRUCTION, T-CONNECTOR THEREFOR AND METHODS OF MAKING THE SAME

Roger D. Meadows; James B. Rush, both of Waynesville, and James S. Bryan, Haywood County, all of N.C., assignors to Dayco Products, Inc., Dayton, Ohio

Continuation of Ser. No. 2,531, Jan. 12, 1987, abandoned, which is a division of Ser. No. 777,804, Sep. 19, 1985, Pat. No. 4,648,628. This application Dec. 12, 1988, Ser. No. 282,669

Int. Cl.[5] B21D *53/06*

U.S. Cl. 29—890.144 **8 Claims**



1. In a method of making a branched hose construction comprising the steps of forming a T-connector to have a body portion provided with a pair of substantially oppositely directed legs extending therefrom and an outwardly directed branch leg extending therefrom intermediate said pair of legs, telescoping three tubular hoses respectively onto said legs so as to be disposed in fluid communication with each other through said T-connector, forming each said hose to have an outer peripheral surface and an annular end surface that is substantially transverse to the longitudinal axis thereof, forming said body portion to have an external peripheral surface adjacent said legs thereof, forming said body portion to have an annular shoulder adjacent each leg thereof and disposed substantially transverse to the longitudinal axis thereof and against which said annular end surface of its respective hose abuts and which is of a size that causes said outer peripheral surface of that respective hose to substantially mate with and thereby be substantially flush with said external peripheral surface of said body portion that is adjacent that respective hose, and clamping annular clamping means respectively about said hoses so as to clamp the hoses against their respective legs of said T-connector, the improvement comprising the step of forming each said annular shoulder of said T-connector to have an outwardly and axially extending projection means thereon that extends longitudinally from the respective annular shoulder and along the respective leg thereof so that each said hose has said annular end surface thereof merely initially abutting said projection means of its respective annular shoulder so that said annular end surface is initially spaced from that annular shoulder and thereafter being axially deformed around its respective projection means by the step of clamping its respective clamping means about said hose so as to substantially longitudinally embed that respective projection means therein.

4,926,536

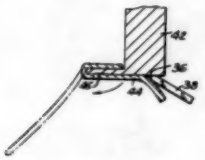
APPARATUS FOR REPLACING A DOOR PANEL

Frank R. Kohut, 107 Columbus St., Bloomfield, N.J. 07003

Continuation-in-part of Ser. No. 248,452, Sep. 23, 1988. This application May 17, 1989, Ser. No. 353,845

Int. Cl.[5] B23P *11/00*

U.S. Cl. 29—238 **10 Claims**



1. A tool for crimping a door panel edge of an automobile door comprising a dolly block having a guide formed therein, handle means mounted on said dolly block, a pad mounted on said dolly block, and crimping means positioned within said guide for crimping a door panel when said pad comes in contact with a door panel adjacent to an edge to be crimped.

4,926,537

TIE ROD AND BALL JOINT SEPARATOR

James L. Pool, Clarinda, Iowa, assignor to Lisle Corporation, Clarinda, Iowa

Continuation of Ser. No. 245,708, Sep. 18, 1988, abandoned. This application Oct. 12, 1989, Ser. No. 423,487

Int. Cl.[5] B25B *27/14*

U.S. Cl. 29—275 **4 Claims**

1. In an automotive separating tool for tie rods, and ball joint connections, the separating tool including: a wedge-shape head that has a first end facing in one direction and a second end facing in the other, opposite direction, that has a pair of tapered spaced-apart prongs extending from the one end of the head in the one direction, with the tapered portion of the prongs creating a wedge to be forced between the parts to be separated; and an elongated handle that extends from the second end of the head in the other direction, said handle having a first end and a distal end, said distal end being adapted to be struck in the one direction during the separating of the parts; the shape of the distal end of the handle being one of either a shape where the distal end may be struck by a hammer or a

shape where the distal end may be driven by an air hammer; the improvement comprising:

a threaded recess formed in the second end of the head with the threaded recess having a tapered bottom; and

a threaded projection formed on the first end of a handle, with the pilot end of the threaded projection being tapered and with the threaded projection being removably threaded into and received within the threaded recess so that the handle and head are connected together during the use of the tool to separate parts, wherein the depth of the threaded recess is less than the length of the threaded projection so that when recess and said projection are threaded together, said recess and said projection tapered surfaces matiningly engage and firmly abut each other to act as means for reduction of the stress on the threads when the handle is driven or hammered.

4,926,538

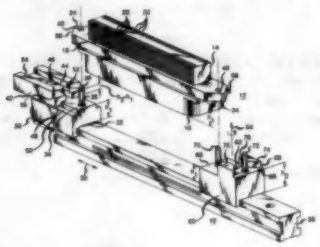
UNIVERSAL NEST FOR A CONNECTOR ASSEMBLY TOOL

Robert H. Bond, Ewing, N.J., and Ivan Pawlenko, Holland, Pa., assignors to American Telephone and Telegraph Company, New York, N.Y.

Filed Oct. 10, 1989, Ser. No. 419,301

Int. Cl.[5] B23Q *7/00*

U.S. Cl. 29—559 **7 Claims**



1. A universal nest for seating a separate one of a first and second connector, each having a pair of opposed ends, the ends of the first and second connectors being of a first and a second height, respectively, the nest comprising:

a base plate;

first support means of a first height slidably mounted on the base plate for movement therealong;

second support means having first and second opposed shelves of a first and a second height, respectively, the second support means being rotatably mounted to the base place to permit a separate one of the first and second shelves to be positioned opposite the first support means so an end of a separate one of the first and second connectors may be seated on a separate one of the shelves, respectively; and

a slide of a thickness on the order of the difference between the first and second heights, the slide slidably mounted on the upper surface of the first support means for movement between a first position, at which a portion of the upper surface of the first support means is exposed to seat the other end of the first connector, and a second position, at which the slide completely overlies the upper surface of the first support means so that the slide serves to seat the other end of the second connector.

4,926,539

APPARATUS HAVING A LIFTING FRAME FOR PROCESSING WORKPIECES

Karl H. Muller, Ingolstadt; Volker Riedl, Gaimersheim, and Bernhard Arbesmeier, Altmannstein/Hagenhill, all of Fed. Rep. of Germany, assignors to Audi AG, Ingolstadt, Fed. Rep. of Germany

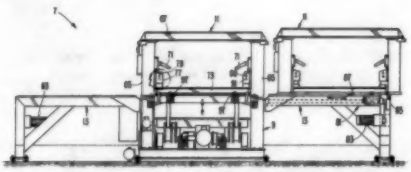
PCT No. PCT/EP86/00773, § 371 Date Jun. 17, 1988, § 102(e) Date Jun. 17, 1988, PCT Pub. No. WO87/03834, PCT Pub. Date Jul. 2, 1987

PCT Filed Dec. 21, 1986, Ser. No. 276,430

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545537

Int. Cl.[5] B23Q *3/155*

U.S. Cl. 29—568 **26 Claims**



1. A device for processing workpieces, wherein a lower tool which receives the workpiece can be moved upward toward an upper tool by a lifting frame comprising:

(a) a tool frame subdivided horizontally from the lifting frame and being mounted onto the lifting frame in an easily releaseable manner;

(b) the tool frame comprising a plurality of columns, a head plate connected to the columns and a base plate detachably fastened to the columns;

(c) the base plate having attached thereto the lower tool while the upper tool is attached to the tool frame but not the base plate; and

(d) the lifting frame comprising a moveable lifting table which can be connected in a raised position to the base plate of the tool frame.

4,926,540

PROCESS FOR PRODUCING AN ELECTRIC MOTOR

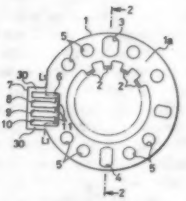
Iwao Kato, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Division of Ser. No. 81,444, Aug. 4, 1987. This application May 31, 1989, Ser. No. 359,152

Claims priority, application Japan, Aug. 5, 1986, 61-183769

Int. Cl.[5] H02K *15/08*

U.S. Cl. 29—596 **3 Claims**



1. A process of producing a motor having at least two stator assemblies, each including magnetic means and a non-magnetic molded member incorporated in said magnetic means, coils wound on the outer periphery of said stator assemblies, and a rotor rotating within said stator assemblies, said process comprising the steps of:

forming said magnetic means to have magnetic pole plate bodies, a recess formed in at least one of said magnetic

pole plate bodies, a bridge member incorporated in said at least one of said magnetic pole plate bodies in such a manner as to close said recess, a plurality of terminal elements respectively having base ends and free ends with the base ends being coupled to said bridge member and the free ends extending into and toward said recess;

molding said stator assemblies by filling said recess of said magnetic means, together with the free ends of said terminal elements, with said non-magnetic molded member;

projecting the base ends of said terminal elements from the surface of said non-magnetic molded member by cutting and removing said bridge member of said stator assembly; and

winding said coils on said stator assemblies and electrically connecting the ends thereof to the projections of said terminal elements.

4,926,541

METHOD OF ASSEMBLING WOUND ROTOR OF VERTICAL TYPE ADJUSTABLE SPEED HYDROELECTRIC ROTATING MACHINE AT ITS INSTALLATION SITE

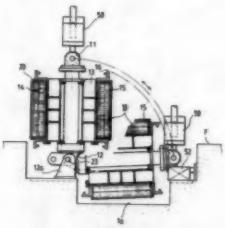
Shinsaku Hakuta; Yasuhiro Yasaka, both of Hitachi; Osamu Nagura, Katsuta; Eiji Tsuji, Hitachi; Makoto Suzuki, Hitachi, and Hirotaka Akagawa, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 10, 1989, Ser. No. 392,059

Claims priority, application Japan, Sep. 14, 1988, 63-228708

Int. Cl.[5] H02K *15/02*

U.S. Cl. 29—598 **6 Claims**



1. A method of assembling a wound rotor of a vertical type adjustable speed electric rotating machine at a power house of a hydroelectric power plant, the method comprising steps of

(a) forming a steel rotor rim around an upright spider with a rotor shaft;

(b) laminating thin steel laminations around a resultant rotor rim to form a rotor core with slots therearound;

(c) clamping the rotor core between end plates;

(d) securing respective end rings to the respective end plates;

(e) laying the resultant rotor body including the spider, the rotor rim, the rotor core, the end plates and the end rings, on its side;

(f) inserting insulated conductor bars into the respective slots of the rotor core;

(g) connecting ends of the respective insulated conductor bars to constitute field coils having a predetermined number of magnetic poles;

(h) binding end portions of the field coils supported in the respective end rings by a binding wire; and

(i) brazing the bound binding wire,

wherein said step (e) is carried out while disposing the rotor body in a pit formed in the power house having enough space to receive the rotor body in a laid-down state with a circumference of the rotor body extending from a foundation of the lower house to a height sufficient to facilitate a carrying out of said steps (f) to (i) by working personnel from the foundation of the power house.

4,926,542

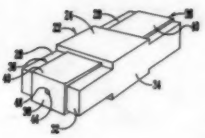
METHOD OF MAKING A SURFACE MOUNT WIREWOUND RESISTOR

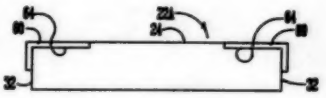
Gary E. Bongger, Columbus, Nebr., assignor to Dale Electronic, Inc., Columbus, Nebr.

Division of Ser. No. 236,718, Aug. 26, 1988, Pat. No. 4,884,053. This application Aug. 21, 1989, Ser. No. 396,067

Int. Cl.[5] H01C *17/28*

U.S. Cl. 29—619 **3 Claims**





1. The method of making a surface mount resistor, comprising,

taking an elongated resistance element comprising a core, a pair of terminal caps on the ends of said core, and a resistance wire wound on said core and electrically connected to said terminal caps, with elongated straight axial leads secured to said terminal caps and extending outwardly in alignment with the longitudinal axis of said core,

embedding said resistance element in a rectangular plastic body member having substantially flat and parallel upper and lower surfaces, and opposite ends with said axial leads extending from said opposite ends,

severing said axial leads at a point adjacent said opposite ends,

and securing electrical terminal pads to said body member in electrical contact with said severed axial leads.

3. The method of making a surface mount resistor, comprising,

taking an elongated resistance element comprising a core, a pair of terminal caps on the ends of said core, and a resistance wire wound on said core and electrically connected to said terminal caps,

taking a rectangular-shaped metal lead frame including opposite sides having electrical lead tabs extending inwardly towards the center of said frame,

connecting said terminal caps to one each of said lead tabs,

embedding said resistance element in a rectangular plastic body member having substantially flat and parallel upper and lower surfaces, and opposite ends with said lead tabs extending from said opposite ends,

severing said lead tabs from said lead frame,

and bending said lead tabs into coplanar engagement with said upper surface of said body member.

4,926,543

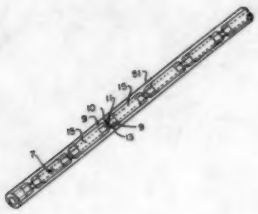
METHOD OF MAKING A SUB-MINIATURE FUSE

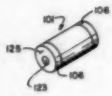
Vaughan Morrill, Jr., Creve Coeur; John H. Scandrett, University City, both of Mo., and David K. Hudson, Granite City, Ill., assignors to Morrill Glasstek, Inc., Maryland Heights, Mo.

Division of Ser. No. 198,762, May 22, 1988, Pat. No. 4,860,437, which is a division of Ser. No. 5,964, Jan. 22, 1987, Pat. No. 4,749,980. This application Aug. 21, 1989, Ser. No. 396,561

Int. Cl.[5] H01H *69/02*

U.S. Cl. 29—623 11 Claims





1. The method of forming a fuse comprising a step of metallizing an elongate substrate to form a continuous metallized conductor on the substrate running lengthwise of the substrate, the continuous metallized conductor comprising a plurality of spaced-apart fusible elements, positioning a cover over the outer surface of the substrate and thereafter a step of cutting through the cover substrate and continuous metallized conductor between spaced-apart fusible elements to form a plurality of fuses from the substrate.

4,926,544

PRODUCTION SYSTEM USING UNMANNED AUTOMATICALLY GUIDED VEHICLES

Haruo Koyanagi, Hachioji; Hideyuki Kumasaka, Yokohama; Koji Takao, Atsugi, and Tomohiko Noda, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Aug. 26, 1988, Ser. No. 236,876

Claims priority, application Japan, Aug. 27, 1987, 62-211421; Aug. 27, 1987, 62-211420

Int. Cl.[5] B23P *21/00*

U.S. Cl. 29—703 13 Claims

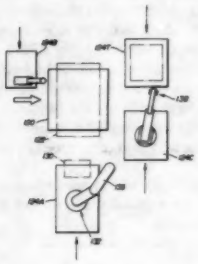
1. An automated delivery and assembly system, comprising:

a first unmanned self-propelled vehicle, said first vehicle being arranged to carry a main work piece;

a second unmanned self-propelled vehicle, said second vehicle being arranged to carry components which are to be secured to the main work piece;

transfer means for moving said components from said second vehicle to the main work piece on said first vehicle;

a control system being arranged to transmit control orders by way of a wireless communication system to said first and second vehicles and said transfer means, said control orders containing data which induces said first vehicle to assume a predetermined position on a work floor, and to induce said second vehicle to move along the work floor, approach said first vehicle and induce said transfer means to place said component on a predetermined site on said



main work piece while said main work piece is on said first vehicle.

4,926,545

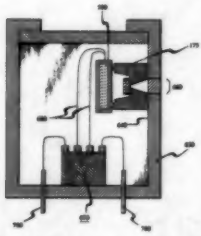
METHOD OF MANUFACTURING OPTICAL ASSEMBLIES

Richard J. Pimpinella, Hampton, and John M. Segelken, Morristown, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 17, 1989, Ser. No. 353,264

Int. Cl.[5] H05K *3/30*

U.S. Cl. 29—832 9 Claims



1. A method of manufacturing at least two articles, comprising the steps of:

providing a substrate having first and second surfaces;

forming, on said second surface, at least first and second sets of electrically conductive regions, each of said sets including at least two electrical contacts and at least one electric conductor electrically connecting said two electrical contacts;

mounting at least first and second optoelectronic devices on the second surface of said substrate, so that each optoelectronic device is in electrical contact with one of said sets of conductive regions;

after said mounting step, dividing said substrate into at least first and second parts, each of said parts including one of said sets of conductive regions and one of said optoelectronic devices; and

completing the manufacture of said articles,

CHARACTERIZED IN THAT

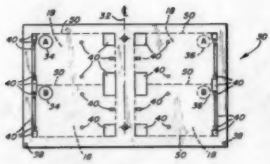
the method further comprises, prior to said dividing step, the step of forming, in said first surface, at least first and second cavities extending from said first surface toward said second surface, and wherein said dividing step leads to each of said parts including one of said cavities.

4,926,546

PC BOARD PANEL CONFIGURATION TECHNIQUE

Mark Polczynski, Elm Grove, and Brian Krueger, Brown Deer, both of Wis., assignors to A. O. Smith Corporation, Milwaukee, Wis.

Filed Jun. 9, 1988, Ser. No. 204,707
Int. Cl.[5] H05K *3/35*
U.S. Cl. 29—840 **8 Claims**



1. A method for configuring a printed circuit board panel adapted for the concurrent fabrication of a plurality of printed circuit boards, said method comprising the steps of:

laying-out patterns for each individual layer of the printed circuit boards; and

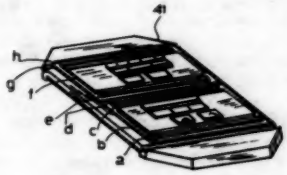
symmetrically arranging, for fabrication on the printed circuit board panel with respect to a center-line thereof, copies of individual ones of the patterns positioned so that identical printed circuit board patterns are in the same location if the printed circuit board panel is rotated through a 180° angle about said center-line.

4,926,547

METHOD FOR MANUFACTURING A MODULAR SEMICONDUCTOR POWER DEVICE

Antonio P. Spatrisano, Palermo; Luciano Gandolfi, Corsico; Carlo Minotti, Catania, and Natale Di Cristina, Palermo, all of Italy, assignors to SGS-Thomson Microelectronics S.p.A., Catania, Italy

Continuation of Ser. No. 160,630, Feb. 26, 1988, abandoned. This application Jun. 27, 1989, Ser. No. 373,647
Claims priority, application Italy, Mar. 9, 1987, 19630 A/87
Int. Cl.[5] H05K *3/34*
U.S. Cl. 29—841 **6 Claims**



1. A method of manufacturing a modular semiconductor power device, comprising the steps of:

(a) welding semiconductor means including at least one semiconductor chip onto conductive-sheet means including at least one sheet of an electrically conductive material;

(b) forming a power-device body by fixing said sheet to a member provided with a heat-dissipating metal plate for dissipating heat generated by the Joule effect and parallel to and close to said heat-dissipating plate;

(c) blanking from a single sheet of conductive material a one-piece frame formed with strips adapted to form signal and power terminals of said device and with temporary connections between outer ends of said strips;

(d) soldering inner ends of said strips selectively to points of said conductive sheet means connected with said semiconductor means or to said semiconductor means;

(e) encapsulating at least active parts of said body and said inner ends of said strips with an insulating resin and leaving said outer ends of said strips and an outer surface of said plate uncovered by said resin; and

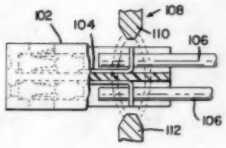
(f) shearing said temporary connections from said strips.

4,926,548

SELECT SOLDER SLOT TERMINATION METHOD

John R. Hopkins, Hummelstown; Randy M. Manning, New Cumberland, both of Pa., and Stephen A. Marusak, New Port Richey, Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 661,744, Oct. 17, 1984, abandoned. This application Jun. 27, 1988, Ser. No. 212,119
Int. Cl.[5] H01R *9/08*
U.S. Cl. 29—860 **1 Claim**



1. A method of terminating insulated electrical conductors in terminals having terminating sections including slots in an electrical connector having a plastic housing, characterized by the steps of:

applying solder on the terminals in the terminating section along the slots;

positioning the terminals in the plastic housing;

positioning the electrical conductors at the entrance to the slots of said terminals in said plastic housing;

driving the conductors into the slots of said terminals in said plastic housing, so that the conductor is in frictional engagement with the terminating section forming an electrical connector therebetween; and

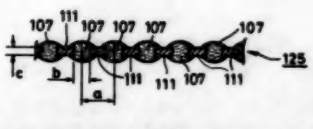
reflowing the solder which gathers at the connection formed between the conductor and the terminating section of said terminals in said plastic housing, by positioning portions of the plastic housing adjacent the terminating section of said terminals in an electromagnetic field to concentrate the electromagnetic field on the terminating section.

4,926,549

METHOD OF PRODUCING ELECTRICAL CONNECTION MEMBERS

Tetsuo Yoshizawa, Yokohama; Yoshimi Terayama, Odawara; Hiroshi Kondo, Yokohama; Takashi Sakaki, Tokyo; Shunichi Haga, Yokohama; Yasuteru Ichida, Machida, and Masaki Konishi, Ebina, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,269
Claims priority, application Japan, May 31, 1988, 63-133401
Int. Cl.[5] H01R *43/20*
U.S. Cl. 29—876 **34 Claims**



1. A method of producing an electrical connection member, comprising the steps of:

applying a carrier containing a light-sensitive resin onto a first electrically conductive member;

forming holes in predetermined portions of the carrier to form a pattern and expose the first electrically conductive member through each of the holes;

filling each hole in the carrier with a second electrically conductive member; and

removing the first electrically conductive member from the carrier.

4,926,550

SHAVING APPARATUS

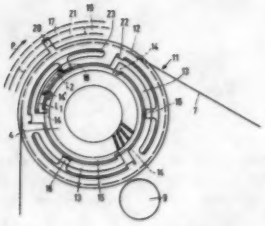
Geert Geertsma; Hendrik Poel, and Andreas Weersink, all of Drachten, Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jan. 19, 1989, Ser. No. 300,402

Claims priority, application Netherlands, Feb. 18, 1988, 8800406

Int. Cl.[5] B26B *19/14*

U.S. Cl. 30—43.1 **3 Claims**



1. A shaving apparatus having a housing comprising a holder for at least one shaving unit, which shaving unit comprises an external shaving member with hair entry apertures and an internal shaving member which is rotatable relative to the external shaving member, the holder comprising a support with a resilient element which acts on the external shaving member, whereas the apparatus comprises an adjustment mechanism for adjusting the stiffness of the resilient element.

4,926,551

DRY-SHAVING APPARATUS COMPRISING AT LEAST ONE SHUTTER WHICH IS SLIDABLE ON THE APPARATUS HOUSING

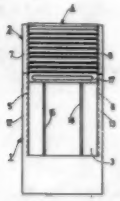
Arno Wolfger, Klagenfurt, Austria, assignor to U.S. Philips Corp., New York, N.Y.

Filed Apr. 21, 1988, Ser. No. 184,309

Claims priority, application Austria, Apr. 24, 1987, A 1026/87

Int. Cl.[5] B26B *19/02*

U.S. Cl. 30—43.92 **9 Claims**



1. A dry-shaving apparatus comprising at least one shutter which is slidable on the apparatus housing for optionally covering or exposing a shear foil of the dry-shaving apparatus, and which is laterally guided at both sides in groove-shaped guides on the apparatus housing, wherein the shutter-wall surface which faces the apparatus housing is spaced from the apparatus housing and at least one sliding guide means situated intermediate the lateral edges of the shutter acts between the shutter and the apparatus housing to provide localized areas of contact between the shutter and the apparatus housing in the sliding direction of the shutter.

4,926,552

CUTTING HEAD FOR RECIPROCATORY-TYPE DRY SHAVERS

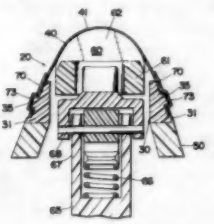
Kiyotaka Otsuka, and Hideji Wataya, both of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Dec. 30, 1988, Ser. No. 292,015

Claims priority, application Japan, Jan. 26, 1988, 63-15065

Int. Cl.[5] B26B *19/02*

U.S. Cl. 30—43.92 **9 Claims**



1. In a cutting head for reciprocatory-type shavers comprising:

a mount frame having a pair of opposed side bars between which a shearing foil extends in a convexly curved manner, said curved shearing foil having a plurality of hair receiving apertures and having a longitudinal axis extending along its top end in parallel with said side bars;

an inner cutter assembly having a plurality of inner blades which are in shearing contact with the undersurface of said shearing foil, said inner cutter assembly being driven within said mount frame to reciprocate along said longitudinal axis for shearing hairs between said shearing foil and said inner blades, said inner cutter assembly being mounted to be movable to a limited extent within said mount frame transversely towards said side bars;

said shearing foil having its lateral lower end portions secured to the exterior surface of said side bars, respectively, such that the lower end portions of said shearing foil are isolated from said inner cutter assembly by the side bars so as not to be in direct contactable relation with the inner cutter assembly, wherein said mount frame includes a pair of elongated clamp plates each of which is placed over the lower end portion of said shearing foil and fixed onto the exterior surface of said side bar to hold said lower end portion of said shearing foil therebetween, each of said clamp plates having its top portion extending above the top edge of the adjacent side bars along the curved surface of said shearing foil to conceal said apertures in a limited region adjacent upwardly of said side bar.

4,926,553
RAZOR

Michael Miskin, 4927 N. Lester, Chicago, Ill. 60630; William Bamford, 778 Leicester Rd., Elk Grove Village, Ill. 60007, and Micheal D. Lake, Chicago, Ill., assignors to Michael Miskin, Chicago and William Bamford, Elk Grove Village, both of, Ill.

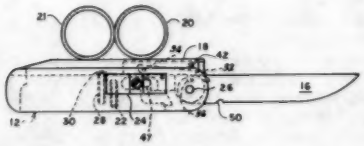
Continuation-in-part of Ser. No. 74,775, Jul. 17, 1987, abandoned. This application Dec. 12, 1988, Ser. No. 283,217
Int. Cl.[5] B26B *21/28*
U.S. Cl. 30—49 12 Claims

1. A razor for removing, trimming and shaping facial hair comprising:
an elongated handle having a longitudinal axis and opposed ends;
a razor head including a cutting edge extending from a surface thereof;
said cutting edge being adapted to engage and sever hair;
a neck joining said razor head to one end of said handle;
said neck having opposed ends with one said end attached to said handle and an opposed end terminating in the form of an expandable ball;
a socket located in a surface of said razor head;
said expandable ball being received in said socket for rotation therein so that an angular position of said razor head relative to said neck can be adjusted about three orthogonal axes of said neck to obtain a desired attitude of said razor head to said handle; and,
locking means operably connected to said expandable ball for locking said razor head after said razor head is adjusted to a desired attitude;
said ball being expandable within said socket by said locking means so that said razor head can be locked into a fixed position by expansion of said ball within said socket to a point where said ball can no longer freely rotate within said socket.

4,926,554
COLLAPSIBLE KNIFE

Wayne C. Martin, Inverness, Ill., assignor to Charles L. Martin, Inverness, Ill.

Filed Aug. 24, 1989, Ser. No. 398,251
Int. Cl.[5] B26B *3/06*
U.S. Cl. 30—161 6 Claims



1. A clasp knife comprising in combination
an elongate body having spaced side walls defining a cavity therebetween,
a blade pivotably attached to said body for pivotable movement between a first position wherein it is disposed in said cavity and a second position wherein it extends from said one end of said body,
a latching lever pivotably attached to said body for pivotal movement between a first position adjacent said body and a second position extending from said one end of said body,
a latching dog pivotably attached to said latching lever,
said blade having a notch therein for receiving said dog when said lever is in said second position to lock said blade in said second position,
spring means biasing said dog into locking engagement with said blade, and
lock actuator means mounted to said body for movement between a first unlocking position for engagement with said latching dog when said lever is in said second position and a second locking position remote from said latching dog.

4,926,555
POCKET KNIFE

Denis J. Lemaire, Boucherville, Canada, assignor to Wenger SA, Delémont, Switzerland

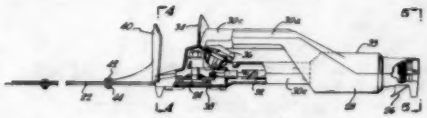
Filed Aug. 16, 1989, Ser. No. 394,520
Int. Cl.[5] B26B *1/00*
U.S. Cl. 30—162 2 Claims

1. A pocket knife comprising a pair of bolster linings superposedly fixed to each other and defining a space therebetween, a cutting blade slidably mounted in said space relative to one of said linings and adjacent thereto, a leaf spring fixed to the other lining in said space, one end of said leaf spring adapted to abut against the end of said blade when the latter is projecting partly out of said linings, a knob connected to the end of said blade and extending out of a slot provided through said first lining, the said knob being pivot connected to the end of said blade and adapted to push on said leaf spring and retract the latter from abutment with the end of the blade.

4,926,556
HAND HELD TRIMMER FOR CUTTING VEGETATION SUCH AS HEDGES AND THE LIKE

Edward A. Pilatowicz, Woodland Hills; Anthony Carsello, Chino, and Richard Landy, Saugus, all of Calif., assignors to Allegretti & Company, Chatsworth, Calif.

Continuation of Ser. No. 121,617, Nov. 17, 1987, abandoned. This application May 23, 1989, Ser. No. 356,613
Int. Cl.[5] B26B *19/02*
U.S. Cl. 30—216 8 Claims



1. A hand held trimmer for cutting heavy vegetation such as hedges and the like, comprising:
a handle, said handle including a plurality of hand grips;
a cutting means, said cutting means being connected to said handle;
a motor means, said motor means being connected to said handle, said motor means and said cutting means being

disposed at substantially opposite ends of said handle and arranged with respect to said handle so as to substantially counterbalance each other; and

resilient drive means, said drive means extending between said motor means and said cutting means and being sufficiently resilient for driving said cutting means so as to substantially avoid damaging said motor means should said cutting means become jammed during operation,

wherein said handle has one lower hand grip and two upper hand grips and said hand grips are positioned substantially at the apices of an inverted triangle.

4,926,557

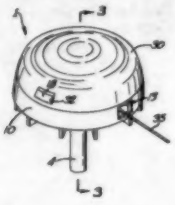
SEMI-AUTOMATIC STRING TRIMMER HEAD

Eugene J. Haupt, Woodland Hills, Calif., assignor to Allegretti & Company, Chatsworth, Calif.

Filed Jul. 21, 1988, Ser. No. 222,652

Int. Cl.[5] B26B 7/00; A01D 50/00

U.S. Cl. 30—276 **20 Claims**



1. A feed head for a string trimmer comprising:

(a) a body member rotatable about a center axis and connectable to a drive means for rotation in a cutting direction;

(b) a substantially cylindrical spool member within said body member coaxial with and rotatable relative to said body member, said spool member having a grooved end face adjacent said body member, said grooved end face having a cam channel of a generally circular shape about the center axis, said cam channel comprised of

a plurality of switchbacks spaced about the center axis, each switchback having a radially inward portion and a radially outward portion and

a plurality of arcuate segments, said switchbacks connecting adjacent arcuate segments, said arcuate segments extending gradually radially outward from the radially inward portion of one switchback to the

(c) a first arm member pivotally connected at a first end to said body member, a second end of said first arm member being biased in a radially inward direction toward the center axis; and

(d) a first cam pin on a second end of said first arm member, said first cam pin extending into and engaging said cam channel, said first cam pin being slidable along said cam channel.

4,926,558

AXE MAUL APPARATUS

Regie P. Brace, Lot 33, Bert's Trailer Park, 401 S. Rte. 7, Milton, Vt. 05468

Filed Mar. 7, 1989, Ser. No. 320,222

Int. Cl.[5] B26B 3/00

U.S. Cl. 30—308.1 **4 Claims**

1. An axe maul apparatus, for splitting blocks of wood or the like, comprising:

a head comprising a one piece block with no moveable parts;

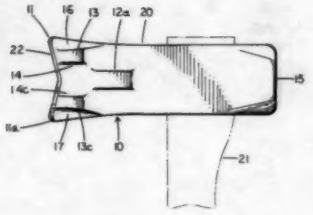
said head having first means for initiating the splitting of a block of wood located at the leading edge of said head;

said first means comprises at least one material penetration means;

said material penetration means comprising means defining tapered leading edge contact points;

said contact points having a cutting edge located behind said contact points;

said head further having second means for flaring apart the sections of said block of wood;



said second means comprises a plurality of flaring wedges;

a plurality of spaced apart ribs; and

maul means located on said head at the end opposite said first means.

4,926,559

MEASURING DEVICE FOR DETERMINING THE POSITION OF WORKPIECE FACES

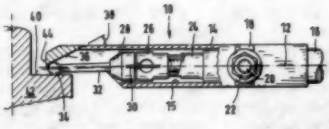
Horst Knäbel, Meerbusch, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Mar. 15, 1989, Ser. No. 323,933

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3808548

Int. Cl.[5] G01B 7/02

U.S. Cl. 33—832 **8 Claims**



1. A device for determining the position of a workpiece face comprising:

a body having a longitudinal axis and a longitudinal bore concentric with said longitudinal axis;

an extendable member having a first end movable within said bore along said axis,

means disposed on said member for moving said first end of said extendable member,

a coupling member fastened to said first end of said extendable member for movement therewith,

means for releasably securing a second end of said extendable member within said bore,

a sensor head,

resilient means for attaching said sensor head to said coupling member,

an essentially spherical contact tip attached to said sensor head and aligned with said axis for travel along an axial path in conjunction with the movement of said first end of said extendable member, and

deflection means for deflecting said tip out of alignment with said axis, said deflection means being attached to said body at a known angle with respect to said longitudinal axis and positioned in said path of said tip, whereby

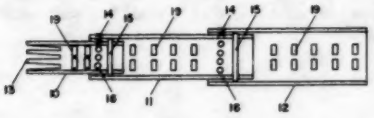
deflection of said tip causes at least one point on the surface of said tip to advance toward said workpiece surface along a path radial to said axis.

4,926,560

SHADE FOR TELESCOPIC SIGHT

Eldon F. Kilgore, 809 Clearwater Trail, Round Rock, Tex. 78664, and Howard J. Kilgore, Rte. 1, Box 190, Elmott, Tex. 76640

Continuation of Ser. No. 120,159, Nov. 13, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,031
Int. Cl.[5] F41G *11/00, 1/38*
U.S. Cl. 33—244 2 Claims



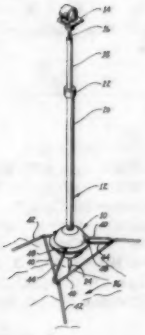
1. An extensible shade for a telescopic sight comprising:
a plurality of concentric tubular sections arranged successively in overlapping, sliding relationship, each section having an exterior surface with a multiplicity of light admitting apertures formed therein,
means to fasten a first one of said tubular sections to an exit end of a telescopic sight, and
means to hold said plurality of tubular sections in fixed position relative to one another.

4,926,561

TRIPOD STAND FOR A SURVEYOR'S ROD

Donald P. Miller, 9239 S. 19th Ave., Phoenix, Ariz. 85041

Continuation-in-part of Ser. No. 59,568, Jun. 8, 1987, Pat. No. 4,803,784. This application Dec. 22, 1988, Ser. No. 289,329
Int. Cl.[5] G01C *15/00*
U.S. Cl. 33—293 25 Claims



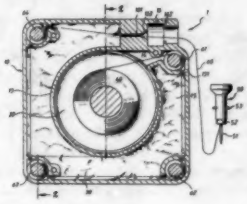
1. A portable stand for a surveyor's rod having a longitudinal axis, said stand comprising in combination:
(a) a tripod for placement upon the surface of interest;
(b) an omnidirectionally rotatable captured element for supporting the rod;
(c) means for attaching said captured element to said tripod;
(d) means for securing the rod to said captured element; and
(e) means for positionally stabilizing said captured element to retain the rod in a predetermined alignment.

4,926,562

CLOSED TYPE OF LINE MARKING DEVICE

Chyn-Herng Hwu, 10 Fl, 76, Lane 131, Shin-Yi Rd., Sec. 3, Taipei, Taiwan

Filed Dec. 2, 1988, Ser. No. 278,758
Int. Cl.[5] G01B *3/02*
U.S. Cl. 33—414 5 Claims



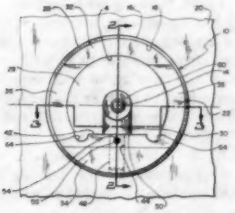
1. A closed type line marking device comprising:
a body including a case defining the inner space of the body, a circular partition wall dividing the inner space into a space serving as a bobbin seat and a space for sealed ink, and a plug seat with a needle path at one end and an opening at the other end;
a thread bobbin disposed in the bobbin seat;
an ink absorbent material stuffed in the ink space;
a plug cap provided with a fixing needle and a compressible leak stoppage plug at one end for sealing the opening of the plug seat; p1 an O-ring for leak stoppage mounted between the bobbin and the bobbin seat;
a flexible ink thread of ink absorbent material wound on the bobbin and running through the ink absorbent material and needle path of the plug seat to the plug cap;
said body further comprising several pulleys located at the places where the ink thread is to make a turn, for facilitating the turning and pulling of the ink thread.

4,926,563

THEODOLITE TARGET ADAPTOR AND METHOD OF USE

Robert L. Smith, Mt. Juliet, Tenn., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 10, 1989, Ser. No. 419,228
Int. Cl.[5] G01C *1/02*
U.S. Cl. 33—293 8 Claims



7. Apparatus adapted to couple a theodolite target with an aperture of tooling comprising:
a cylindrical disk-like member having a circular exterior surface adapted to be received and supported in a circular aperture of the tooling, the exterior surface having chamfered edges to facilitate the insertion and removal of the disk-like member with respect to the aperture, the disk-like member having an interior surface formed to define a space in which a theodolite target is to be received and

supported, the disk-like member having a thickness at its upper and its lower portions essentially the same as the aperture in which it is to be received and with a lesser thickness at the sides between the upper and lower portions, the disk-like member having a flat surface on the lower portion of the interior surface with a hole extending therein radially with respect to the axis of the disk-like member, the hole being of a size to receive the cylindrical base of the theodolite target to be received and supported, and with a threaded aperture extending through the disk-like member into the hole;

a set screw mounted in the threaded aperture for fixedly securing the theodolite target in position in the disk-like member and with respect to the tooling; and

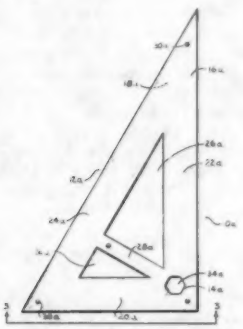
a pair of essentially semi-circular slots formed in the lower portion on opposite sides of the hole and parallel with the axis adapted to receive a fixture for the insertion of the disk-like member into the tooling in which it is to be received and for its removal therefrom.

4,926,564

TRIANGULAR DRAFTING INSTRUMENT

C. J. Loggins, Sheboygan, Wis., assignor to Mayline Company, Inc., Sheboygan, Wis.

Filed Dec. 27, 1988, Ser. No. 290,744
Int. Cl.[5] G01B 3/00
U.S. Cl. 33—474 **19 Claims**



1. A drafting instrument comprising:

a triangular integrally formed planar body having an upper face and a lower face, having three elongate perimeter legs being a first, base leg with first and second ends, a second, upright leg with first and second ends, and a third, hypotenuse leg with first and second ends, each of said legs being of equal width throughout its length, with the second end of said base leg interconnected to the first end of said upright leg at a right angle, the second end of said upright leg interconnected to the first end of said hypotenuse leg, and the second end of said hypotenuse leg interconnected to the first end of said base leg, forming the triangular configuration of the drafting instrument, the width of said legs being such that an open space is defined in the interior of said body;

an elongate interior leg of equal width throughout its length, extending in the plane of said body from the interconnection of said base leg and said upright leg to said hypotenuse leg intermediate its first and second ends, and interconnected therebetween such that a right angle is formed between said interior leg and said hypotenuse leg;

a plurality of glide points extending outwardly from at least one of said upper and lower faces of said body a short distance so as to contact a planar surface upon which the drafting instrument is positioned with the planar body of the drafting instrument parallel to said planar surface, and suspend said planar body above said planar surface in stable parallel relation thereto; and

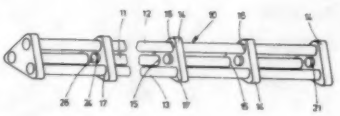
a handle assembly including an aperture penetrating said body near the interconnection between said base leg and said upright leg, a shaft to be received through said aperture in sliding relation therewith and a pair of end caps each interconnected to a different end of said shaft, each of said end caps having a thickness equal to or less than the distance of extension of each of said glide points from said body and having a dimension parallel to the plane of said body greater than the dimension of said aperture in the plane of said body, so as to retain said shaft within said aperture.

4,926,565

END MEASURE, PARTICULARLY STEPPED END MEASURE

Hans-Helmut Kümmerer, Tamm, Fed. Rep. of Germany, assignor to C. Stiefelmayer KG, Esslingen, Fed. Rep. of Germany

Filed Nov. 21, 1988, Ser. No. 274,195
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806791
Int. Cl.[5] G01B 3/38
U.S. Cl. 33—567 **25 Claims**



1. An end measure, comprising at least one linear support having a longitudinal axis; a plurality of touching surfaces extending substantially perpendicularly to said longitudinal axis of said support and spaced from one another by predetermined distances, said support being formed as at least one pipe provided with a plurality of plates which are spaced from one another in direction of said longitudinal axis; a plurality of pin parts having ends with end surfaces which form respective ones of said touching surfaces, said pin parts being transversely spaced from said pipe.

4,926,566

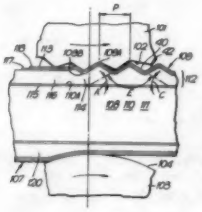
METHOD OF PRODUCING A METROLOGICAL SCALE AND SCALE PRODUCED BY SUCH METHOD

D. R. McMurtry, Wotton-under-Edge; W. F. N. Stephens, Badminton, and M. Kirkbride, Dursley, all of United Kingdom, assignors to Renishaw PLC, Gloucestershire, United Kingdom

Continuation of Ser. No. 165,989, Mar. 2, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 368,152
Claims priority, application United Kingdom, Jul. 3, 1986, 8616240
Int. Cl.[5] G01B 3/10
U.S. Cl. 33—771 **16 Claims**

1. A method of producing a metrological scale wherein the scale comprises an elongate scale member having a reference plane and intended to have a periodic surface profile composed of alternate first and second surfaces which are elongate in a direction transverse to the length of the member and which differ regarding their position relative to the reference plane, the method comprising passing the member between rollers one of which has a plain cylindrical surface and the other one of which has a surface which is generally cylindrical but which

has a profile being the counterpart of the surface profile of the scale, and passing the member through the nip of the rollers



while applying pressure therebetween thereby to deform one surface of the scale member in accordance with the profile of said other roller .

4,926,567

PROCESS AND APPARATUS FOR DRYING COATED WEB

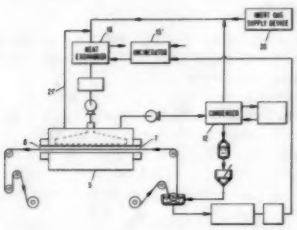
Masaharu Ogawa, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jul. 2, 1986, Ser. No. 881,271

Claims priority, application Japan, Jul. 4, 1985, 60-145706; Jul. 4, 1985, 60-145707

Int. Cl.[5] F26B *3/04*

U.S. Cl. 34—23 **7 Claims**



1. A process for drying a web coated with a coating composition containing an inflammable organic solvent which comprises, drying said coated web by passing through a closed-type oven where a hot inert gas is filled, recovering a substantial portion of said organic solvent from the exhaust gas of said oven by condensation, heating the exhaust gas of said condenser by incinerating the organic solvent remaining therein and returning said heated exhaust gas to said oven.

4,926,568

SOLE PROTECTOR ATTACHMENT

Cynthia L. Coffman, 909 Madeira N.E., Albuquerque, N. Mex. 87108

Filed Feb. 6, 1989, Ser. No. 306,628

Int. Cl.[5] A43B *13/28, 3/24;* A61F *5/14*

U.S. Cl. 36—15 **6 Claims**

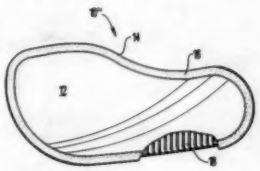
1. A sole protector attachment for securement to a woven or knitted sock or slipper, comprising:

a sole-shaped thin flat flexible pad formed from a wear resistant material;

a narrow edging extending only around a periphery of said pad;

said edging having an upper surface provided with hook portions of cooperating hook and loop type fastening strips for engagement with said woven or knitted sock or slipper;

a sole member extending in spaced parallel relation with said pad; and



a plurality of elongated transversely extending unconnected solid rods sandwiched between said pad and said sole member, said rods disposed in side by side abutting relation and extending along the entire length of said sole member.

4,926,569

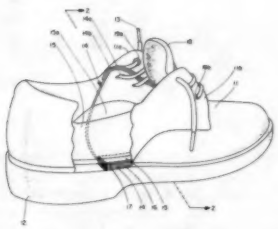
SHOE WITH CRADLE ARCH SUPPORT

Richard P. Bunch, Reading, Mass., assignor to Converse Inc., North Reading, Mass.

Filed Oct. 31, 1988, Ser. No. 264,628

Int. Cl.[5] A43B *7/14, 13/40*

U.S. Cl. 36—91 **2 Claims**



1. A shoe comprising:

a sole, having a medial region and a lateral region;

an upper attached to the sole;

an arch support device including an elastic strap having first and second ends, the first end having first attachment means for removably attaching such end to the sole at a sole attachment site, the second end being removably attached to the upper; and

a cushioned insole disposed above the strap, such insole having arch support padding and second attachment means for removably attaching the insole to the strap at a strap attachment site;

so that the shoe may be readily reconfigured to be used either with an elastic strap to provide arch support via the cushioned insole or with the cushioned insole alone.

4,926,570

SHOE INNER SOLE, PARTICULARLY INSOLE OR WELT

Manfred Fohst, Dierdorf, Fed. Rep. of Germany, assignor to Lohmann GmbH & Co. KG, Neuwied, Fed. Rep. of Germany

Filed Jul. 20, 1988, Ser. No. 222,098

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1987, 3724327

Int. Cl.[5] A43B *13/38*

U.S. Cl. 36—43 **10 Claims**

1. Shoe inner sole, particularly insole or welt for working or

safety shoes, with a binder and a non-woven fabric as well as antistatic additives, wherein the non-woven fabric comprises a

mixture of fibers with between approximately 1 to 10% by weight of electrically conductive staple fibers.

4,926,571

CONNECTION FOR CONNECTING COMPRESSED-AIR LINES

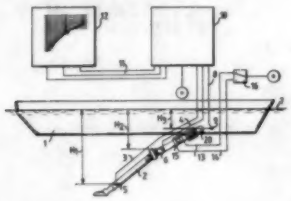
Karl Johannsen, Lübeck-Travemünde, Fed. Rep. of Germany, assignor to O&K Orenstein & Koppel Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed Apr. 26, 1988, Ser. No. 186,148

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1987, 3714220

Int. Cl.[5] E02F *3/88*

U.S. Cl. 37—72 **8 Claims**



1. In a connection for connecting compressed-air lines arranged on the body of a floating dredge, the compressed-air lines leading to measuring devices, control devices or the like mounted on the floating dredge, with compressed-air lines mounted on a suction pipe of the floating dredge used for suction pipe position measuring units for the operation of pneumatic drives of throttle valves or the like arranged on the suction pipe, the suction pipe including a suction pipe elbow with a sliding plate, the improvement comprising the compressed-air lines mounted on the suction pipe being connected to a coupling component mounted on the sliding plate, a coupling countercomponent being fastened to the body of the dredge near the sliding plate, the compressed-air lines leading from the coupling countercomponent to the measuring devices, control devices or the like.

4,926,572

MEDICATION TIMING DEVICE

Gordon W. Holmes, Toronto, Canada, assignor to Professional Packaging Limited, Mississauga, Canada

Filed Aug. 24, 1988, Ser. No. 235,500

Claims priority, application United Kingdom, Aug. 24, 1987, 8719932

Int. Cl.[5] G09F *9/00*

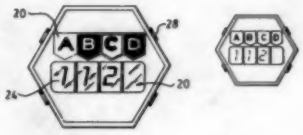
U.S. Cl. 40—448 **10 Claims**

1. A medicament regime control device, comprising:

a housing having an upper face,

display means associated with said upper face having a plurality of individual side-by-side displays for displaying numerals therein,

electronic circuit means within said housing and operatively connected to said display means for controlling interchangeable messages conveyed by numerals displayed by said display means, including a message corresponding to the number of units of medication of selected ones of differing medicaments, and



individual distinguished indicia on said upper face one adjacent each of said displays corresponding to individual medicament to be taken by a patient.

4,926,573

COVER FOR SMOKING ACCESSORY

Homer S. Hetrick, 501 Alison Ave., Mechanicsburg, Pa. 17055

Filed Aug. 8, 1988, Ser. No. 229,421

Int. Cl.[5] G09F *3/08*

U.S. Cl. 40—663 **4 Claims**

1. In a cigarette lighter assembly having a socket adapted to removably receive lighter means, the improvement comprising a covering plug including:

an outwardly facing surface having an annular locking portion extending away from said surface in a direction opposite to the outwardly facing direction; and

said annular locking portion having flexible locking means for securing said plug in said socket.

4,926,574

RIFLE WITH SAFETY SYSTEM

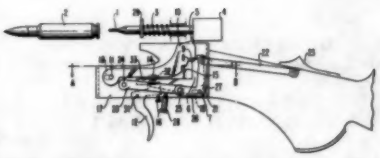
Benedikt Rieger, Altenmunster-Hegnenbach, Fed. Rep. of Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,224

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3735773

Int. Cl.[5] F41C *17/04*

U.S. Cl. 42—70.04 **17 Claims**



1. A rifle, comprising a firing pin with a striker member and a cocking spring, a triggering system with a trigger, and safety means having a cocked position and an uncocked position operatively associated with the stock of the rifle, a guided cage movable in a direction of a barrel of the rifle, a catch lever rotationally movably attached to the cage engaging the striker member so that the firing pin can also be moved against a

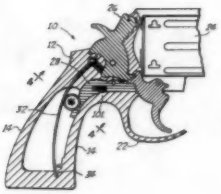
cocking spring with the cage, said catch lever releasing the striker member only in the cocked condition of the trigger and a lever of the safety means that moves the cage being operable from a stock neck of the rifle.

4,926,575

GUN GRIP EMBLEM MANUAL SAFETY

Walter Pastor, 1100 NE. 182 St., North Miami Beach, Fla. 33162

Continuation of Ser. No. 286,465, Dec. 19, 1988, abandoned. This application Jun. 12, 1989, Ser. No. 366,537
Int. Cl.[5] F41C *17/02*
U.S. Cl. 42—70.06 11 Claims



1. A safety assembly for use in combination with a hand gun of the type including a rebound slide disposable between a locking position and a release position relative to movement of a trigger lever, a firing pin block, a trigger and a hammer to accomplish the firing cycle of the hand gun, said assembly comprising:

(a) a piston assembly movably mounted in a handle of the gun and extending transversely therethrough in communicating relation with each oppositely disposed handle stock portion mounted on opposite sides of the handle of the gun,

(b) said piston assembly comprising two piston segments, a longer piston segment and a shorter piston segment connected together in spaced apart relation and each movably mounted at least partially within a different one of said handle stock portions,

(c) each of said piston segments including an exposed outer end surface and said piston assembly including a longitudinal dimension sufficient to selectively dispose each of said outer end surfaces concurrently in adjacent relation to an outer surface of a respectively positioned handle stock portion,

(d) said rebound slide including an integrally formed tail portion of unitary design, said tail portion containing a concave area projecting inwardly therefrom for accommodation of said longer piston segment when said safety assembly is disposed in an interruptive position, said interruptive position defined by a blocking disposition of said longer piston segment relative to said tail portion of said rebound slide as said rebound slide moves between the locking position and the release position thereof,

(e) said piston assembly selectively positionable along a longitudinal dimension between a safety position and an operative position,

(f) said safety position defined by substantially flush disposition of each outer end surface of said piston segments with the outer surface of the correspondingly positioned handle stock portions, and disposition of said tail portion of said rebound slide in said interruptive position, and

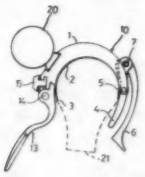
(g) said operative position defined by respective recessed and protruding positions of said piston segments relative to correspondingly positioned handle stock portions and disposition of said tail portion of said rebound slide out of said interruptive portion.

4,926,576

MOUNTING DEVICE ADAPTABLE ON A WEAPON

Félix V. Maes, Barchon, and Michel Balkrich, Tilff, both of Belgium, assignors to ARSOC S.P.R.L., Barchon, Belgium

Filed Aug. 9, 1988, Ser. No. 330,137
Claims priority, application Belgium, Aug. 13, 1987, 08700903
Int. Cl.[5] F41G *1/38*
U.S. Cl. 42—101 15 Claims



1. A mounting device for fixing an instrument or accessory onto a weapon, comprising a body adapted to carry an instrument, said body having a surface featuring at least an attachment edge or surface intended to mate with the surface of one side of the weapon, a pivotal lateral leg mounted on the body in order to mate with the surface of the weapon on the side which is opposite to the one where said attachment edge or surface fits, said pivotal lateral leg having a cut allowing for a pressure shoulder, and a locking means mounted on said body in order to keep said pivotal lateral leg in a state of pressure on the weapon, said locking means consisting of a lever jointed on a pivot mounted on said pivotal lateral leg, said lever having surfaces to mate with the pressure shoulder arranged on said body when said lever is in a clamping position, said surfaces and said pressure shoulder being so shaped that, when the locking lever is in clamping position, the pressure shoulder exerts such a pressure on said surfaces that the lever is caused to pivot thereby to maintain said pivotal lateral leg in clamping engagement with the weapon, thereby when the pivotal lateral leg is in engagement with the surface of the weapon, said body is rigidly fixed onto the weapon through clamping engagement on the opposite sides of the weapon.

4,926,577

QUICK GLIDING LURE

Konstantin Radtchenko, 235 Manhattan Ave., Jersey City, N.J. 07307

Filed Jan. 24, 1989, Ser. No. 300,943
Int. Cl.[5] A01K *85/00*
U.S. Cl. 43—42 16 Claims

1. A quick glide fish lure comprising an elongated body, said body as viewed by a longitudinal vertical cross section comprises:

(a) an upper facing surface extending the length of said body;

(b) a rear portion extending from a rearward most tip to a vertical plane, generally perpendicular with said surface, and bisecting said bodies center of gravity;

(c) a front portion extending from a frontward most tip to the center of gravity plane;

(d) a front lower surface having a downwardly convex shape beginning at said front tip and running to said center of gravity plane;

(e) a first rearward lower surface having a downwardly concave shape which connects and transitions from the

convex shape at the center of gravity plane and then arcs towards said rearward tip;

(f) a second rearward lower surface, descending from said rearward tip toward said front at an angle less than 90 degrees from said upper surface and connecting said first rearward lower surface; and

(g) at least one fish hook attached to said body.

4,926,578

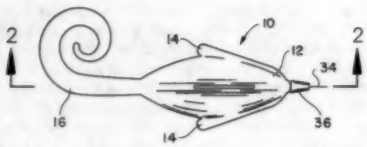
FISHING LURE

James D. Morse, 210 Hunt's Neck Rd., Poquoson, Va. 23662, and Daniel C. Morris, II, 1733 Old Buckingham Rd., Hampton, Va. 23669

Filed Dec. 5, 1988, Ser. No. 279,927

Int. Cl.[5] A01K *85/00*

U.S. Cl. 43—42.24 **7 Claims**



1. A soft plastic body fishing lure comprising:

(a) a body having a front, rear, top, bottom, first side and second side portions;

(i) said top portion being substantially flat;

(ii) said bottom portion

having said first and second side portions being flat and parallel with said top portion, and further having a V-shaped keel portion, having an apex, where the apex corresponds to said bottom portion's midpoint, and said keel connects said side portions, said keel running the length of said body;

(iii) said body, as viewed from the top, having an oval shape where said front and rear portions correspond to the ends of aid oval, and further having wings attached to said first and second side portions, said wings beginning at said front portion, extending along the sides of said oval and ending approximately midway between said front and rear portions;

(b) a tail portion substantially longer than said body, attached to said body's rear portion having a uniform thickness where the tail's top and bottom extend from said flat top portion and said flat bottom portions respectively, said tail further having a spirally wound shape; and

(c) a fish hook removably embedded in said body.

4,926,579

SNAG-PROOF SAFETY FISHING LURE

Miguel A. Jimenez, P.O. Box 1146, Douglas, Ariz. 85607

Filed May 3, 1989, Ser. No. 347,229

Int. Cl.[5] A01K *93/00*

U.S. Cl. 43—42.44 **18 Claims**

1. A snag-proof fishing lure comprising in combination:

(a) a J-shaped hook having a barb at a curved end thereof and a first eyelet at a shank end thereof;

(b) a shield having a recess in a lower surface thereof to cover the barb when the lure is not submerged;

(c) means positioned below the first eyelet for pivotally connecting the shield to a shank of the hook; and

(d) floatation means associated with the shield as the hook sinks in water to effectively lift the shield to expose the barb.

4,926,580

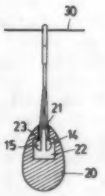
SAFETY SINKER

Chen-Ju Lin, No. 13, Lane 194, Chung Hsuo Road, Taichung, Taiwan

Filed Oct. 3, 1989, Ser. No. 415,937

Int. Cl.[5] A01K *75/06*

U.S. Cl. 43—44.89 **1 Claim**

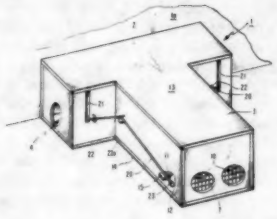


1. A safety sinker, including

a sinker coupler unitarily made of resilient plastic material through shape molding process and generally comprised of a retaining ring portion having a gap made thereon for insertion therethrough of a fish line into the inner space thereof, a neck portion extending downward from said retaining ring portion, a fork end portion extending from said neck portion, and two opposite semi-sphere members made on the two terminals of said fork end portion, a sinker comprising an opening, and an inner chamber communicating with said opening;

characterized in that said two semi-sphere members of said sinker coupler are spaced away from each other, after having been incorporated into a spherical configuration and inserted into said inner chamber of said sinker through said opening, to firmly connect said sinker to a fish line, and said two semi-sphere members may be squeezed to close together to form into a spherical configuration so as to disconnect from said sinker when a pull force is applied thereto.

4,926,581
ANIMAL TRAP
August Grivas, 3215 Avenue L, Brooklyn, N.Y. 11210
Filed Jul. 6, 1989, Ser. No. 375,897
Int. Cl.[5] A01M 23/08
U.S. Cl. 43—61 14 Claims

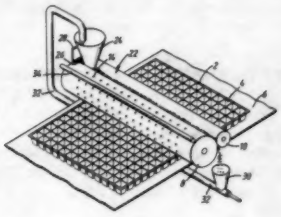


1. A T-shaped animal trap comprising:
in the head portion of the T,
entry ports at opposite ends thereof, and
a sliding door above each of said entry ports when said entry ports are open, each of said sliding doors being positioned to slide down inside of each of said entry ports;
in the leg portion of the T,
at least one open screened window,
a platform near said open screened window, said platform attached on a dowel above the bottom of said trap, said platform being tilted with said dowel when weight from an animal moves thereon; and
a trigger mechanism, wherein
said dowel traverses the width of said leg portion and passes through holes in the sides of said portion sized to permit rotation of said dowel,
a magnet on each end of said dowel, and
two flexible metal wires, each one extending from attachment to one of said sliding doors to reach one of said magnets when each of said sliding doors is above each of said entry ports whereby, when said platform and dowel tilt, said wires are thereby released from said magnets allowing said doors to slide downward simultaneously closing said entry ports.

4,926,582
LOW POUR CRUDE OIL COMPOSITIONS
Kaye L. Motz, Ponca City, Okla.; Roger A. Latham, Carouge, Switzerland, and Robert J. Statz, Kennett Square, Pa., assignors to E. I. duPont de Nemours & Company, Wilmington, Del.
Filed Jun. 2, 1988, Ser. No. 202,151
Int. Cl.[5] C10L 1/16, 1/22
U.S. Cl. 44—62 14 Claims

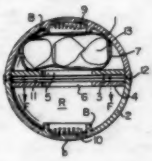
1. In the process of transporting waxy curde oils through a pipeline, the improvement which comprises incorporating into said crude oil an effective pour point depressant amount of an additive comprising a polymer selected from the group consisting of copolymers of ethylene and acrylonitrile, and terpolymers of ethylene, acrylonitrile, and a third monomer selected from the group consisting of vinyl acetate, carbon monoxide, alkyl acrylates, alkyl methacrylates, alkyl vinyl ethers, vinyl chloride, vinyl fluoride, acrylic acid, and methacrylic acid, wherein the amount of third monomer in the terpolymer ranges from about 0.1 to about 10.0 precent by weight.

4,926,583
APPARATUS FOR SELECTING AND DISCHARGING SEEDS
Thomas W. Hamilton, Stoke Poges, United Kingdom, assignor to T W Hamilton Design Limited, United Kingdom
Filed Mar. 28, 1988, Ser. No. 174,247
Claims priority, application United Kingdom, Apr. 11, 1987, 8708734
Int. Cl.[5] A01G 9/08, 7/18
U.S. Cl. 47—1.01 10 Claims



1. A seeding machine comprising:
first and second movable surfaces positioned to make contact along a common line and thereafter separating to define a seed trough,
means for moving the surfaces defining the trough in a direction away from the common line to cause any seeds in the trough to tumble continuously, one of said surfaces defining a plurality of openings,
a source of pressure difference;
means coupling said openings to said source of pressure difference to enable an individual seed to be attracted to each opening and to allow the said one surface to carry the individual seeds to a location for discharge, and
end stop means comprising a wall of bristles in sliding engagement with the opposite walls of the trough, and mounted adjacent at least one end of the trough for preventing the spillage of seeds from that end of the trough.

4,926,584
APPARATUS FOR HYDROPONIC FARMING
Hiroshi Horibata, Mitaka House, No. 25-20 5-Chome, Kamirenjaku, Mitaka-Shi, Tokyo 181, Japan
Continuation of Ser. No. 175,105, Mar. 30, 1988, abandoned. This application Aug. 2, 1989, Ser. No. 393,095
Claims priority, application Japan, Mar. 31, 1987, 62-47982[U]
Int. Cl.[5] A01G 31/00
U.S. Cl. 47—59 23 Claims



1. An aquatic float for hydrophonic gardening comprising:
a floatable curved surface vessel means having a cavity formed within the vessel for enclosing a bulb to be grown therein, the vessel cavity having an exterior and an interior wall;
a floatable coaster means having a substantially planar extent and extending across the cavity for partially closing the

cavity, the coaster means having an aperture therein in alignment with seedbed means which is spaced from the coaster means;

the seedbed means being located on the interior wall of the vessel for supporting the bulb disposed in the cavity of the vessel, the seedbed means having a plurality of passage means in a defined arrangement extending through the interior and exterior walls of the vessel for receiving growing hair roots of the bulb;

wherein the aperture of the coaster means has a shape and size substantially corresponding to the defined arrangement of the passage means and is in alignment therewith.

4,926,585

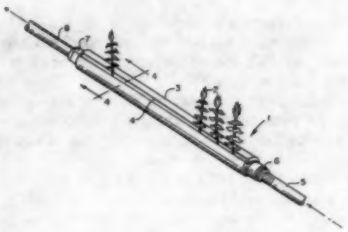
PLANT NUTRIENT DELIVERY SYSTEM HAVING A POROUS TUBULAR MEMBER

Thomas W. Dreschel, Titusville, Fla., assignor to The Bionetics Corporation, Hampton, Va.

Continuation-in-part of Ser. No. 21,448, Mar. 4, 1987, abandoned. This application Apr. 7, 1988, Ser. No. 179,036

Int. Cl.[5] A01G *31/02*

U.S. Cl. 47—64 **33 Claims**



1. In a method of hydroponic growth of a plant from seed and a nutrient solution, said method comprising the steps of supporting the seed and subsequent plant roots directly on a microporous membrane and supplying liquid nutrients to said seed and subsequent plant roots by migration through said membrane, the improvement comprising the steps of:

providing a section of rigid tubular pipe defining an opening in its walls;

supporting a seed and subsequent plant roots directly on a tubular hydrophilic microporous membrane telescopically received inside of said pipe, said tubular membrane and said tubular pipe being provided in a spaced telescopic arrangement to provide a sufficient air space without a growing medium therebetween for said seed and subsequent plant roots to be positioned directly on said membrane adjacent to said opening so that the stem of said plant can grow outwardly through said opening and the roots of said plant supported between said tubular pipe and said tubular membrane can grow unimpeded and in contact with said membrane such that the seed and subsequent plant root are held in the air space between the exterior of said membrane and interior of said tubular pipe, the pores in said membrane being sized to be sealed by surface tension of said solution provided along the length of said tubular membrane except where said roots contact said membrane whereby said solution only flows through said membrane when in contact with said roots by capillary action to said roots;

supporting said membrane in a circumferentially spaced relationship to the interior of said rigid pipe;

providing a nutrient solution at one end of said tubular membrane; and

removing nutrient solution from the other end of said tubular membrane.

8. In an apparatus for hydroponic growth of a plant from seed and a nutrient solution:

a section of rigid tubular pipe defining an opening in its wall;

a rigid tubular, hydrophilic, microporous member telescopically received inside of said pipe, said rigid tubular member and said tubular pipe being provided in a spaced telescopic arrangement to provide a sufficient air space without a growing medium therebetween for a seed to be positioned directly on said member adjacent to said opening so that the stem of said plant can grow outwardly through said opening and the roots of said plant supported between said tubular pipe and said tubular member can grow unimpeded and in contact with said member such that the roots are held in the air space between the exterior of said member and the interior of said tubular pipe, the pores in said member being sized to be sealed by surface tension of said solution provided along the length of said tubular member except where said roots contact said member whereby said solution flows through said member when in contact with said roots by capillary action to said roots;

a support means to support said member in a spaced relationship to the interior of said rigid pipe;

inlet means connected to one end of said tubular member adapted to receive said nutrient solution; and

outlet means connected to the other end of said tubular member adapted to remove said nutrient solution.

4,926,586

BOX FOR CULTIVATING PLANT

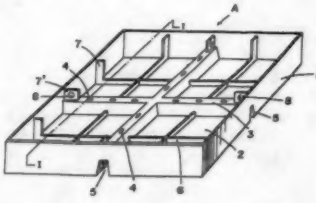
Mutuo Nagamatsu, 33-4, Kasumigaoka 4-chome, Higashi-ku, Fukuoka-shi, Japan

Continuation of Ser. No. 72,072, Jul. 10, 1987, abandoned. This application Mar. 3, 1989, Ser. No. 319,900

Claims priority, application Japan, Oct. 23, 1986, 61-253152

Int. Cl.[5] A01G *9/02*; E02D *29/00*

U.S. Cl. 47—66 **3 Claims**



1. The combination of a building having a roof, a drainage pipe at the periphery of the roof and a roof-protective covering substantially entirely covering the roof and comprising a plurality of rectangular-shaped turf cultivating plant boxes which are installed on the roof contiguously laterally and longitudinally to form a grid,

each said turf cultivating plant box comprising:

(a) a rectangular bottom plate bounded by four side walls,

(b) a first hollow ridge extending longitudinally entirely across the box between a first opposed pair of said side walls and having a central portion substantially equidistantly spaced from the side walls of said first opposed pair of side walls,

(c) a second hollow ridge extending laterally entirely across the box between a second opposed pair of said side walls and having a central portion substantially equidistantly spaced from the side walls of said second opposed pair of side walls,

(d) the first and second hollow ridges being constituted of elevated portions of said bottom plate, the ridges each having an upper extremity which is of lesser elevation than the side walls,

(e) the central portion of the first hollow ridge and the

central portion of the second hollow ridge integrally merging at right angles,

(f) a multiplicity of water drainage perforations formed through each of the first and second ridges at regular intervals at the upper extremity thereof,

(g) the underside of each of the first and second ridges defining water drainage grooves communicating with said multiplicity of perforations and opening at each end through a respective wall of said respective opposed pair of walls between which said respective ridge extends, the groove defined by the first ridge and the groove defined by the second ridge communicating with each other at said integrally merged central portions, said openings of said water drainage grooves being aligned and in communication with the openings of the water drainage grooves formed in a plurality of turf cultivating plant boxes which are laterally and longitudinally contiguous with said cultivating plant box to form continuous lateral and longitudinal water drainage channels,

(h) each of said boxes being filled to a level above said ridges with soil for cultivating turf, and

(i) natural turf planted on said soil.

4,926,587

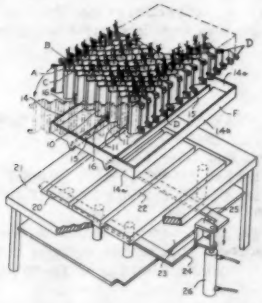
METHOD AND APPARATUS FOR PROPAGATING PLANTS

Aart van Wingerden, Hwy. 191, Rte. 1, Box 74A, Horse Shoe, N.C. 28742

Continuation of Ser. No. 933,741, Nov. 2, 1986, abandoned. This application Apr. 18, 1989, Ser. No. 341,254

Int. Cl.[5] A01G *9/02, 9/10*

U.S. Cl. 47—85 **1 Claim**



1. For use in a tray for propagating seedlings and the like utilizing a plurality of elongated strips which form a plurality of rows of growing compartments, a molded plastic frame comprising:

a bordering member encompassing a plurality of strips forming rows of growing compartments extending about and confining said strips therewith; horizontally spaced vertical support members extending across said bordering member and having connection therewith; and said support members being vertically spaced below said bordering member to permit the strips to be placed thereacross to support the strips from the bottom while the strips are confined at their ends within said bordering member; spaced vertical slots within a lower portion of each of said strips for reception of respective support members.

4,926,588

DEVICE FOR CENTERING OF OPTIC LENSES IN A MECHANICAL MOUNTING, IN PARTICULAR DURING EDGE CUTTING AND BEVELLING

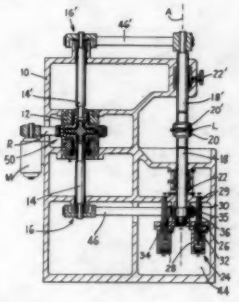
Erhard Brueck, Heuchelheim, Fed. Rep. of Germany, assignor to Wilhelm Loh Wetzlar Optikmaschinen GmbH & Co. KG, Wetzlar, Fed. Rep. of Germany

Filed Dec. 23, 1988, Ser. No. 289,922

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 374411

Int. Cl.[5] B24B *13/005, 5/02;* **B23B** *19/02, 33/00*

U.S. Cl. 51—217 T **11 Claims**



1. A device for centering optic lenses in a mechanical mounting for edge cutting and bevelling, comprising:

a housing;

a drive shaft and two coaxially aligned centering spindles rotatably supported in said housing, said centering spindles having a pair of respectively mutually adjacent ends, said mutually adjacent ends carrying clamping cups thereon for clamping a lens therebetween, one said centering spindle being axially movably supported in said housing, the other said centering spindle being axially adjustably arranged in said housing, said centering spindles being constructed as rigid, radially and axially supported shafts;

drive elements drivingly connected between said drive shaft and said centering spindles, and motor means drivingly connected to said drive shaft for rotating said drive shaft and said centering spindles; and

pressurized fluid-actuated clamping means disposed in said housing for moving said centering spindles both axially toward and away from one another, said clamping means including means defining at least one pressure cylinder adapted to receive pressurized fluid and having an axis parallel to a direction of relative axial movement of said centering spindles, said clamping means further including a membrane piston which is engageable with an end of said one centering spindle opposite said clamping cups for urging said one centering spindle for axial movement in said housing relative to said pressure cylinder.

4,926,589

PRESSURIZED HOSE HANDLE WITH SYSTEM CONTROLS

Kenneth E. Abbott; Patrick J. Lyons, and Richard M. Satariano, all of Tucson, Ariz., assignors to Stripping Technologies Inc., Tucson, Ariz.

Filed Oct. 4, 1988, Ser. No. 253,233

Int. Cl.[5] B24C *5/02*

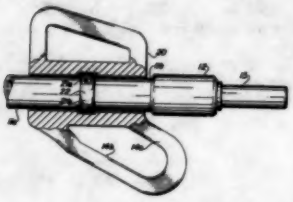
U.S. Cl. 51—427 **1 Claim**

1. A handle system for a pressure hose comprising:

(a) a stop mechanism attached substantially at a first end of the hose;

(b) an operator's handle totally containing said stop mecha-

nism, said operator's handle disposed between the stop mechanism and a second end of the hose, said handle encircling said hose such that said hose may rotate within said handle, and wherein said stop mechanism presses against said handle during pressurization of said hose; and,



(c) an operator's control panel located on said operator's handle, said operator's control panel for control of operational functions affecting said pressure hose and external to said handle system.

4,926,590

STAGING

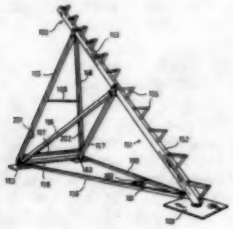
Benjamin J. Harris, Elm Tree House, Wendlebury, England (0X6 8PN)

Filed Mar. 24, 1989, Ser. No. 328,501

Claims priority, application United Kingdom, Mar. 26, 1988, 8807257; Jul. 16, 1988, 8817000; Jan. 31, 1989, 8902045

Int. Cl.[5] E04H 3/12

U.S. Cl. 52—8 **14 Claims**



1. Staging comprising:

a pair of mutually spaced support assemblies, each support assembly comprising,

a truss member having front and rear ends,

a first pair of legs arranged in an inverted-V configuration to support said truss member with a rearward inclination, upwardly, each leg of said first pair of legs having upper and lower ends,

first connection means positively connecting said first pair of legs to said truss member to prevent movement of said legs longitudinally of said truss member,

bracing means for determining the spacing of said lower ends of said first pair of legs, and

a pair of tie bars each linking said lower end of a respective leg of said first pair of legs with said front end of said truss member; and

a plurality of decking members bridging said truss members of said support assemblies in a stepped configuration.

4,926,591

ROOFING METHOD AND APPARATUS

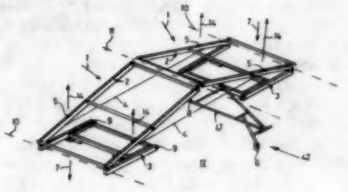
Johannes Buijs, Krimpen a/d IJssel, Netherlands, assignor to Adviesbureau D3BN Civiel Ingenieurs B.V., Netherlands

Filed Dec. 2, 1988, Ser. No. 278,863

Claims priority, application Netherlands, Dec. 3, 1987, 8702908

Int. Cl.[5] E04B 1/343

U.S. Cl. 52—63 **21 Claims**



1. A method of forming a roofed structure from a frame and a tent cloth, comprising the steps of:

lifting the frame having two roof elements pivotally joined along a ridge line defining two frame halves and having two wall elements pivotally joined to the roof elements along roof edge lines from a flat starting position by at least two points, such that the roof elements are lifted first on a side of the ridge line until the roof elements are at a given angle relative to each other;

connecting a tie member to the roof elements, in a loaded condition, to define the given angle between the roof elements;

additionally lifting the frame and swivelling the wall elements outwardly to substantially vertical positions in which the wall elements are relatively fixed to the roof elements; and

swivelling outwardly wall spreaders, hinged to the wall elements about lines parallel to the ridge line, to positions in which the wall spreaders extend substantially in one plane.

4,926,592

BREAKAWAY SIGN POST COUPLING

Charles O. Nehls, Allen Park, Mich., assignor to Unistrut International Corp., Ann Arbor, Mich.

Filed Feb. 10, 1989, Ser. No. 308,552

Int. Cl.[5] E02D 27/42; F16D 1/00

U.S. Cl. 52—98 **15 Claims**

1. A breakaway coupling for a roadside support post to be used in conjunction with a ground engaging mounting post having a portion extending above ground level comprising, in combination:

a pedestal mounting member having a longitudinally extending shank for engagement with said mounting post, and a generally triangular shaped base plate transversely located at one end of said shank;

means for firmly attaching said shank to said mounting post;

a support post mounting member having a longitudinally extending standard for engaging said support post and a generally triangular shaped slip flange congruent to said base plate transversely located at one end of said standard;

means for firmly attaching said standard to said support post;

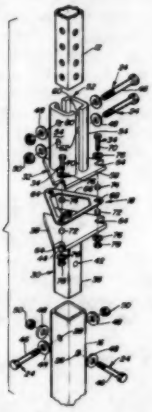
generally V-shaped notches at the corners of said triangular shaped base plate and triangular shaped slip flange;

a friction reducing gasket located between said base plate and said slip flange;

a bolt and nut connection inserted in each notch drawing said plate and flange together with said gasket therebetween; and

a pair of cam rollers on each bolt, one located between said

gasket and said base plate, and the other located between said gasket and said slip flange;



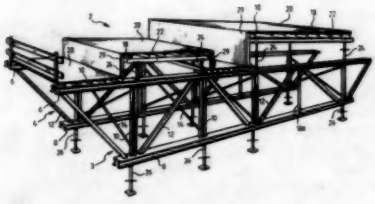
whereby when said post is subjected to a vehicular impact, said slip flange will slide relative to said base plate severing said support post mounting member and support post from the base plate of said pedestal mounting member.

4,926,593

TRUSS ARRANGEMENT

Ronald J. Johnston, Georgetown, Canada, assignor to Aluma Systems Ltd., Downsview, Canada

Continuation of Ser. No. 813,242, Dec. 24, 1985, Pat. No. 4,787,183. This application Nov. 28, 1988, Ser. No. 277,006
Claims priority, application Canada, Dec. 27, 1984, 471047
The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.
Int. Cl.[5] E04G *11/36*
U.S. Cl. 52—126.4 6 Claims



1. A structural member for use in a concrete forming structure comprising a pair of tubular members disposed in parallel relation with each tubular member integral with opposed webs which in combination with said tubular members define an enclosure extending the length of said tubular members, each web to a side opposite said enclosure including opposed flanges which in combination with the particular web define an open bolt slot extending in the length of said tubular members.

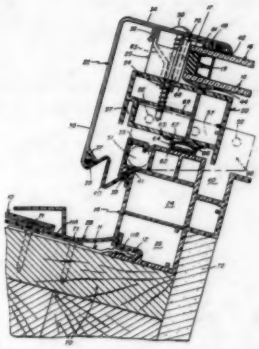
4,926,594

SKYLIGHT CONSTRUCTION

Robert Sampson, Sanford, and Sean Flanigan, Wells, both of Me., assignors to Wasco Products, Inc., Sanford, Me.

Filed Dec. 13, 1988, Ser. No. 283,797
Int. Cl.[5] E04B *7/18*
U.S. Cl. 52—200 34 Claims

1. A skylight construction for an opening in a building or the like comprising: a curb frame extending about the opening including means for securing thereof about the opening, translucent or transparent means for covering the opening and extending at edges to overlie the curb frame, means for retaining the covering means on the curb frame, said means for retaining including a retainer and associated securing fastener,



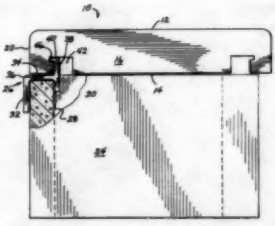
and a cushioning member disposed between said retainer and curb frame and including a resilient cushioning piece supported laterally adjacent the peripheral edge of said covering means, said cushioning member having passage means therethrough for receiving and guiding said securing fastener.

4,926,595

RETAINING WALL CAP UNIT

Robert W. Dean, Jr., Milwaukee, Wis., assignor to Stonewall Landscape Systems, Inc., Milwaukee, Wis.

Filed May 1, 1989, Ser. No. 345,884
Int. Cl.[5] E04F *19/02*
U.S. Cl. 52—300 9 Claims



1. A cap unit for a retaining wall, said retaining wall being constructed of a plurality of retaining wall blocks in which at least the uppermost course of retaining wall blocks is provided with a plurality of connector members, each connector member having an upstanding portion extending above the upper surface of the blocks in said uppermost course, said cap unit comprising:

first and second end surfaces;

first and second side surfaces extending between said first and second end surfaces;

a top surface; and

a bottom surface;

said cap unit being adapted for placement on said uppermost course of retaining wall blocks such that either its first end surface or its second end surface faces outwardly; and

said bottom surface being provided with a pair of cavities, with one of said cavities being disposed toward said first

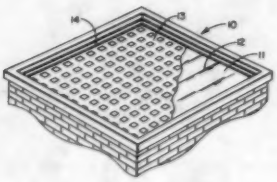
end surface and the other of said cavities being disposed toward said second end surface, said cavities being arranged such that one of said cavities receives the upstanding portion of said connector member when said cap unit is positioned such that said first end surface faces outwardly, and the other of said cavities receives the upstanding portion of said connector member when said cap unit is positioned such that said second end surface faces outwardly.

4,926,596

ROOF DECK COVERING SYSTEM

Robert C. Yeamans, 2777 Northwest Blvd., Columbus, Ohio 43221

Filed Jan. 6, 1989, Ser. No. 294,023
Int. Cl.[5] E04B 7/00
U.S. Cl. 52—408 **4 Claims**



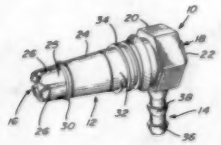
1. A system for covering a roof deck comprising,
a roof waterproofing membrane positioned on said roof deck and secured at the periphery of said roof deck,
a flat sheet apertured overlay positioned on top of said membrane immediately adjacent thereto and in contact therewith and secured at the periphery of said roof deck,
said apertured overlay being provided with a plurality of apertures therein and being made of a material having significantly less elongation than said membrane.

4,926,597

DEVICE FOR COLLECTING SAP

Bernard Landry, St-Damien, Canada, assignor to IPL Inc., St-Damien, Canada

Filed Mar. 29, 1988, Ser. No. 182,281
Int. Cl.[5] A01G 23/10
U.S. Cl. 47—52 **8 Claims**



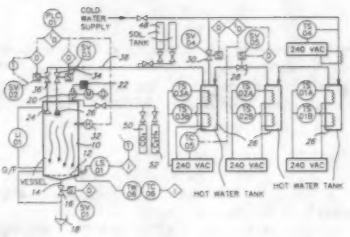
1. A device for collecting sap from trees and for directing said sap to a sap collecting system operable under vacuum conditions, comprising: a longitudinal hollow body having an open end and a closed end, said body including a frusto-conical section adapted to be forced into outer layers of a tree to be sap-collected, said frusto-conical section displaying, adjacent to the open end of said body, sap irrigating means having one end adjacent said open end to allow sap in said outer layers to be received and directed to said open end and into said hollow body; said frusto-conical section displaying thereon an annular groove which is located adjacent an opposite end of said sap irrigating means on said body; resilient sealing means having an inner portion tightly secured in said groove and an outer portion extending beyond said groove and engaging, when received in a tree, the adjacent tree layers to provide a sealing engagement between the frusto-conical section and the tree layers by radial compression to thereby prevent air infiltration in said body when said sap collecting system is operating under vacuum conditions; said closed end of said body displaying a rigid section adapted to be hit in order to force said frusto-conical section into said layers; and tube securing means extending perpendicularly from said rigid section, said securing means being hollow and contiguous with said hollow body for direction sap collected in said body to said sap collecting system.

4,926,598

METHOD AND APPARATUS FOR GERMINATING SEED SPROUTS

Huy Chung, Apt. No. 417, 11950 Pierrefonds Blvd., Pierrefonds, Quebec, Canada (49A 2X5)

Filed Oct. 20, 1988, Ser. No. 260,305
Claims priority, application Canada, Nov. 2, 1987, 550819
Int. Cl.[5] A01L 1/02
U.S. Cl. 47—61 **6 Claims**



1. An apparatus for accelerated germinaton of seeds comprising:
an enclosed vessel having a screen in a lower portion of the vessel to hold a layer of seeds, the vessel having a drain in the lower portion below the screen,
a shower at the top of the vessel to spray water from a water supply onto the screen,
water heating means with water temperature sensing device and means to control temperature of the water supply to the shower,
an air supply means having an air heating means to supply air through an air inlet at the top of the vessel, the air flowing downwards and exiting through the drain,
air temperature sensing device in the vessel and means to control the air temperature in the vessel,
moisture producing means in the vessel with humidity measuring device and means to control humidity in the vessel, and
sequence control means to control a soaking step and an air flow step with intermittent spraying from the shower.

4,926,599

ADJUSTABLE LOUVERED AWNING

Edward Scholz, 5131 W. Ainslie, Chicago, Ill.

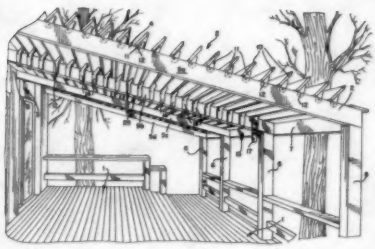
Filed Jan. 17, 1989, Ser. No. 297,578
Int. Cl.[5] E06B 7/086
U.S. Cl. 49—88 **4 Claims**

1. An adjustable, louvered awning inclined downwardly and extending outwardly from a building wall or the like and supported at its outer end, comprising:
(a) a plurality of beams extending substantially parallel to each other and forming an awning frame;
(b) a plurality of louver vanes extending across the top of each of said beams in parallel relationship to each other;
(c) each of said vanes having an upper edge and a lower

surface, and a fitting protruding downwardly from said lower surface adjacent said upper edge in alignment with one side of at least one of said beams;

(d) each of said fittings being pivotally connected to said one side;

(e) said vanes being pivotally moveable between a position wherein they are lifted off said beams and the awning is opened and a position wherein the lower edges of each of said vanes overlap the upper edges of the next lower vane and the awning is closed;



(f) each of said vanes also having an operating arm protruding downwardly from said lower surface adjacent said upper edge in alignment with one side of one other one of said beams;

(g) each of said operating arms being pivotally connected to said one side of the corresponding one beam;

(h) an operating bar pivotally connected to the lower end of each of said operating arms; and

(i) one of said operating arms including a blocking mechanism for releasably locking said vanes in any of a plurality of positions by engaging in, or disengaging from, a member on said corresponding one beam.

4,926,600

SECTION FORMING A GRIPPER FOR AUTOMOBILE GASKETS

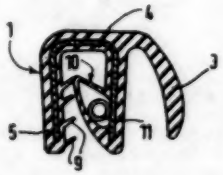
Gerard Mesnel, Carrieres sur Seine, France, assignor to Etablissements Mesnel S.A., Carrieres-sur-Seine, France

Filed Dec. 22, 1988, Ser. No. 288,230

Claims priority, application France, Dec. 23, 1987, 87 18032; Aug. 1, 1988, 88 10376

Int. Cl.[5] E06B *7/16*

U.S. Cl. 49—491 **14 Claims**



1. An automobile gasket gripper for capping a projecting element of an automobile, comprising:

a capping member having substantially parallel faces adapted to receive the projecting element;

said capping member having projecting parts projecting from each face adapted to contact the projecting element;

at least one projecting part being hollow and having a wall which contacts the projecting element with its outer face, the projecting part having disposed therein a means for exerting a substantially constant counterpressure on a portion of an inner face of the wall of the tubular element opposite the outer face;

wherein the capping comprises a longitudinal metal core having a U-shaped cross-section and a sheath or plastic-like material surrounding the core; and

wherein upon receiving the projecting element, the counterpressure means bears against a portion of the longitudinal metal core.

4,926,601

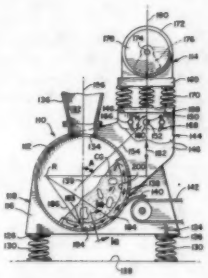
VIBRATORY TUMBLING APPARATUS

Albert Musschoot, Barrington, Ill., assignor to General Kinematics Corporation, Barrington, Ill.

Filed Mar. 9, 1989, Ser. No. 320,994

Int. Cl.[5] B24B *31/06*

U.S. Cl. 51—7 **19 Claims**



1. A vibratory apparatus, comprising:

a container having a curved material supporting surface disposed about a generally horizontal longitudinal axis, said container having a center of gravity offset from said longitudinal axis, said curved material supporting surface having a plurality of generally circumferential, parallel troughs disposed along said longitudinal axis;

said container having a material input end and a material discharge end, said material input end being axially spaced from said material discharge end of said container, said troughs each having a positive pitch in a direction toward said material discharge end to feed the material from the input end to the discharge end;

means for resiliently mounting said container relative to a mounting surface; and

vibration generating means mounted on said container for producing vibratory forces directed along a linear path, said linear path being displaced not only from said longitudinal axis but also from said center of gravity of said container.

4,926,602

EDGE SANDER HAVING ADJUSTABLE SUPPORT TABLE OR TABLES

Robert H. Crouch, 7 Lakes Box 578, West End, N.C. 27376

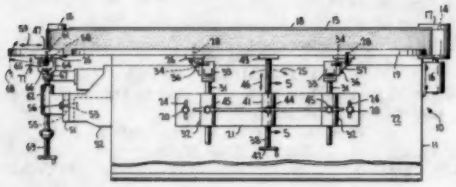
Filed Jul. 27, 1989, Ser. No. 385,580

Int. Cl.[5] B24B *21/10*

U.S. Cl. 51—135 R **11 Claims**

1. A belt sanding apparatus having apparatus having a longitudinally extending, endless belt trained over both a drive roll and a driven roll for finishing a workpiece, said belt having an abrasive surface, the apparatus comprising an elongated support frame, means for mounting said rolls on said frame for rotation about fixed upstanding axes, a workpiece support table on said frame, means for mounting said table to said frame for four-way adjustment relative to said belt, said means comprising an elongated support bracket plate mounted on said frame for pivotal movement about a transverse tilt axis extending

perpendicular to the belt surface, guide means connected to said table and being in engagement with said bracket plate for vertical sliding movement and for pivotal movement together with said table about said transverse tilt axis, moving means on said bracket for vertically moving said table along an axis



parallel to said belt surface, means connecting said table to said guide means for effecting movement of said table both along a horizontal axis parallel to said transverse tilt axis and about a roll axis extending parallel to said belt, whereby said table is capable of vertical, horizontal, tilt and roll adjustments relative to said belt.

4,926,603

CENTERLESS GRINDING

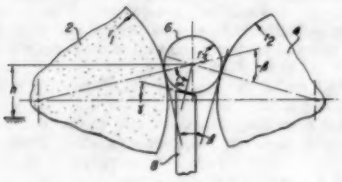
Martin Frost, Bristol; Bruce J. Horton, Hertfordshire, and Jonathan L. Tidd, Devon, all of England, assignors to University of Bristol, United Kingdom

Filed Jul. 1, 1988, Ser. No. 214,668

Claims priority, application United Kingdom, Jul. 2, 1987, 8715544

Int. Cl.[5] B24B *49/00*

U.S. Cl. 51—165.77 **8 Claims**



1. A centerless grinding maching for grinding a component having a generally circular periphery, the machine comprising:

(a) means for supporting the component at points on its periphery during grinding:

(b) means for detecting periodic irregularities in the periphery of the component during the grinding of the component;

(c) means for analysing the periodic irregularities in the periphery of the component detected by the detecting means, the analysing means producing a signal indicative of the adjustment in the position of the component necessary to eliminate, during grinding, the detected periodic irregularities in the periphery of the component; and

(d) means for periodically adjusting the support means of the component in response to the signals from the analysing means to eliminate said periodic irregularities in the periphery of the component.

4,926,604

METHOD FOR CORRECTING ABRASION IN A ROBOT HAVING A WEARING TOOL MOUNTED THEREON

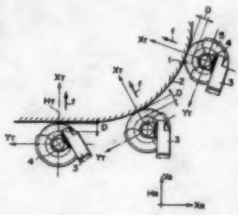
Masaaki Hara; Seigo Nishikawa; Taketoshi Tazaki, and Hiroshi Inokuchi, all of Kitakyushu, Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka, Japan

Filed Dec. 28, 1988, Ser. No. 291,300

Claims priority, application Japan, Dec. 28, 1987, 62-329719

Int. Cl.[5] B24B *49/00*

U.S. Cl. 51—165.88 **4 Claims**



1. A method for correction of abrasion in a robot having a wearing tool mounted thereto, the method comprising setting a coordinate system H_T with respect to a wearing tool mounted to a wrist of a robot separately from a rectangular coordinate system H_R of a robot, providing a sensor externally of the robot, detecting said tool prior to and after abrasion, calculating the worn amount of said tool from a difference between positions of the robot when the sensor is turned on or off, and parallel-shifting the worn amount at the coordinate system set to said tool to effect correction of abrasion.

4,926,605

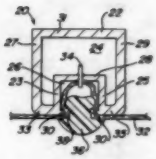
CONSTRUCTION ASSEMBLY FOR CLOSURE STRUCTURE

Les Milliken, 101 S. McCall Rd., and K. Blair Milliken, 305 Gladstone Blvd., both of, Englewood, Fla. 34223

Filed May 9, 1988, Ser. No. 191,419

Int. Cl.[5] E04H *15/18*

U.S. Cl. 52—63 **5 Claims**



1. A construction assembly for closures and the like comprising:

a plurality of substantially elongated joinable members;

said elongated members each having defined therein at least one longitudinal channel, said channel being defined by a first channel wall, a second channel wall, and a channel base disposed therebetween;

a covering material;

means for anchoring said covering material into said channel of selected ones of said elongated members, said means for anchoring comprises a plurality of staples;

a plurality of flexible elongated trim pads having at least two coplanar longitudinal slots defined therein; and

said elongated trim pads adapted to be fixed into said channels thereby substantially locking said covering material therein and forming a tight seal thereby;

each of said joinable members being hollow and having an outer periphery which is substantially squareshaped in cross section;

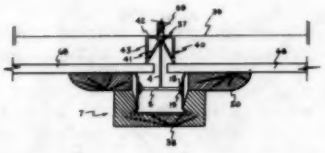
said square shape being defined by a first side member having a base member edge and a first adjacent wall edge, a second side member having a base member edge and a second adjacent wall edge, a base member interconnecting said base member edges of said first side member and said second side member, a first adjacent wall interconnecting said first adjacent wall edge of said first side member and said first channel wall, and a second adjacent wall interconnecting said second adjacent wall edge of said second side member and said second channel wall.

4,926,606

ORNAMENTAL CEILING SYSTEM

Carl E. Hanson, 666 Greenbrier, Crystal Lake, Ill. 60014

Filed Nov. 14, 1988, Ser. No. 271,229
Int. Cl.[5] E04B 5/52
U.S. Cl. 52—484 **23 Claims**



1. An ornamental ceiling that attaches close to a preexisting structural ceiling, comprising:

(a) an inverted T-member having a generally vertical portion and a generally horizontal portion;

(b) a stile having an upper face, a lower face and a longitudinal groove generally centrally disposed along the upper face of the said stile;

(c) a clip associated with said longitudinal groove having a means for attaching said clip to the horizontal portion of said inverted T-member, wherein the horizontal portion of said inverted T-member is located above the upper face of said stile;

(d) a panel located above the lower face of said stile and laterally from the vertical portion of said inverted T-member; and

(e) a connecter attached to an upper end of the generally vertical portion of said inverted T-member and having a resilient snap-on means for readily gripping the upper end of the generally vertical portion of said inverted T-member and a means for securing the connector directly to a preexisting structural ceiling so that the distance between the lower face of stile and the preexisting structural ceiling may be less than six inches.

4,926,607

COMPRESSION LEG

William J. Platt, Collingdale, Pa., and Thomas E. Rose, Dunwoody, Ga., assignors to National Rolling Mills, Inc., Frazer, Pa.

Filed Aug. 14, 1989, Ser. No. 393,355
Int. Cl.[5] E04B 5/55
U.S. Cl. 52—484 **4 Claims**

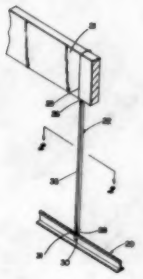
1. For use with a ceiling construction having

(a) a suspended ceiling formed of grid members and a ceiling surface secured to such grid,

(b) a structural member above the suspended ceiling for supporting the suspended ceiling, and

(c) hanger wires extending longitudinally in tension between and connected to the structural member and the grid members for hanging the suspended ceiling from the structural member, an improvement applied to a hanger wire after the wire is in place in the ceiling construction, comprising

a fixed length compression leg extending longitudinally from the structural member to the grid member and having a



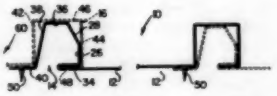
tubular portion that envelopes the hanger wire, and a longitudinally extending slot in the tubular portion that permits the leg to be applied in a lateral direction to the wire, wherein the leg forms a resistance to upward movement of the ceiling.

4,926,608

ROOFING PANEL

Albert Beauregard, Hull, Canada, assignor to Ideal Roofing Company Ltd. Manufactures, Ottawa, Canada

Filed May 9, 1989, Ser. No. 349,518
Claims priority, application Canada, May 30, 1988, 568153
Int. Cl.[5] E04D 1/00
U.S. Cl. 52—522 **26 Claims**



1. A roofing panel for application with its longitudinal direction in the direction of slope of a roof, said panel comprising

an elongated thin rectangular body section having first and second longitudinal edges and respective first and second longitudinal upstanding ribs of inverted channel configuration adjacent said edges, said first and second ribs being of substantially the same height, and of substantially the same width at the bottom of the upstanding parts thereof, and a central portion extending between said ribs and configured to extend parallel to said roof;

wherein said first rib has an inner side thereof remote from said first longitudinal edge, the bottom section of said inner side is formed to a position approximately parallel to said central portion and spaced therefrom to form an inwardly facing slot adjacent said central portion, and said slot extends a substantial distance into the interior of said first rib, and wherein said second rib has a first outer side the bottom section of which includes said second edge and which bottom section is formed to a position substantially coplanar with said central portion to form an inwardly facing flange;

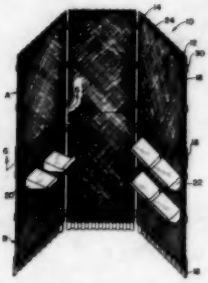
whereby when a first said panel is placed adjacent a second said panel, said second rib of said second panel fits over said first rib of said first panel and said flange is then housed in said slot.

4,926,609

EXHIBIT DISPLAY

Joseph Arico, 308 Larson Rd., North Brunswick, N.J. 08902

Filed Oct. 18, 1988, Ser. No. 259,197
Int. Cl.[5] A47F 5/00
U.S. Cl. 52—582 **43 Claims**



36. A freestanding knockdown display system comprising, a plurality of structural panels of substantially similar construction, each said structural panel having a front surface, a rear surface and a top, bottom, and side peripheral edges, flexible hinge means for releasably hinging at least a pair of said structural panels in a side-by-side relationship to form a first panel section, a second panel section of substantially similar construction as said first panel section, a recessed portion on said front surface adjacent a peripheral edge other than a side peripheral edge of each of said structural panels, said recessed portion defining a secondary front surface rearwardly spaced from said front surface, said secondary front surface of said recessed portion of each said structural panel of said first panel section having securement means associated therewith, said rear surface of each said structural panel of the second panel section having complementary securement means associated therewith, said securement means being cooperable with said complementary securement means to releasably engage said recessed portion of one structural panel to said rear surface of another structural panel to thereby vertically and releasably join said first panel section to the second panel section so that the front surfaces of the structural panels in said first panel section are substantially flush with the front surfaces of the structural panels in said second panel section with substantially no obstructions from said first panel section to said second panel section.

4,926,610

VARIABLE-WIDTH MOLDING AND BRIGHTWORK

Norman C. Jackson, Livonia, Mich., assignor to The Standard Products Company, Cleveland, Ohio

Filed Dec. 12, 1988, Ser. No. 282,708
Int. Cl.[5] B60R 27/00
U.S. Cl. 52—716 **8 Claims**

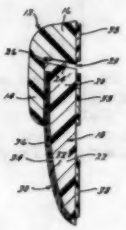
1. A body side molding comprising:

an elongated member having an inner and outer surface;

an elongated receiver, L-shaped in cross-section, adapted for interfitting engagement with said elongated member, said receiver having a first arm and a second arm connected to said first arm, said arms defining said L-shape of said receiver;

said elongated member having a portion being received between said arms of said receiver and being overlapped by one of said arms of said receiver, wherein said width of said molding can be varied by varying the degree of overlap of said elongated member by said overlapping arm of said receiver;

brightwork covering at least a portion of said outer surface of said elongated member, said brightwork having a visible portion which can be varied by varying the degree of overlap of said elongated member by said receiver, said brightwork comprising a metallic-appearing layer; and



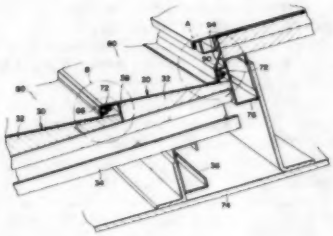
an end cap adapted for sealing engagement with an end of said molding.

4,926,611

METHOD OF ASSEMBLING A ROOF STRUCTURE

Motokatsu Funaki, 430 Shimotsuchidana, Fujisawa-shi, Kanagawa-ken, Japan

Division of Ser. No. 910,576, Sep. 23, 1986, Pat. No. 4,803,818.
This application Jul. 25, 1988, Ser. No. 223,579
Claims priority, application Japan, Sep. 26, 1985, 60-210958; Sep. 26, 1985, 60-210959; Dec. 16, 1985, 60-280999
Int. Cl.[5] E04G 21/14
U.S. Cl. 52—748 **1 Claim**



1. A method of assembling a roof structure formed of a plurality of roof boards extending at a downward incline from a ridge to an eave by connecting said plurality of roof boards to one another in adjacent side by side relation between the ridge and the eave and mounting the roof boards on a roof support means, said roof boards each having a flat surface section, a ridge side connection portion formed at the side of the flat surface section facing the ridge and an eaves side connection portion formed at the side of the flat surface section facing the eave comprising the steps of:

mounting a rising ridge side support means on said roof support means;

fixing a holding member on said rising ridge side support means;

holding the ridge side connection portion of the roof board of the plurality of boards closest the ridge on said holding member;

arranging a backing member having an eaves side end closest the eave and a ridge side end closest the ridge under said roof board closest to the ridge;

securely abutting the eaves side end of said backing member against a fixture fixed on said roof support means at a position on the eaves side of the backing member beyond said eaves side connection of said roof board closest to the ridge to the roof board closest to the eave and;

repeating the above steps on the backing members, the fixture and the plurality of roof boards until said roof structure is complete.

4,926,612

MACHINE FOR INSERTING MAIL INTO ENVELOPES

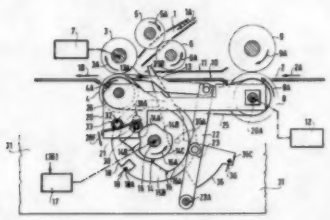
Marek Krasuski, Fontenay Aux Roses, and Bernard Prugnolle, Pantin, both of France, assignors to Societe Anonyme dite: ALCATEL SATMAN, Bagneux, France

Filed Jul. 17, 1989, Ser. No. 380,238

Claims priority, application France, Jul. 27, 1988, 8810121

Int. Cl.[5] B65B *43/26*

U.S. Cl. 53—69 **8 Claims**



1. A machine for inserting mail into envelopes, the machine comprising:

a first set of wheels and an associated first set of backing wheels for bringing an envelope to a defined "filling" position and presenting it facing a mail path;

mail advance means on the mail path for advancing an item of mail towards the envelope in the filling position;

means for actuating the first set of backing wheels from a presser position to a retracted position when the envelope is in said filling position; and

envelope body opening means controlled to move from a retracted position to an opening position when the envelope is in said filling position;

wherein said first set of backing wheels is coupled via a freewheel mechanism to said mail advance means in order to be driven therewith, said advance means themselves being mounted at a distance from said first set of backing wheels which is less than the length of the items of mail to be inserted in the envelopes; and

wherein the machine also includes first detector means for detecting partial insertion of an item of mail into an envelope, said detection means being coupled to said means for actuating the first set of backing wheels to return them to their presser position, thereby ensuring that the item of mail is fully inserted into the envelope.

4,926,613

PROCESS FOR FILLING AND SUBSEQUENT FUSION WELDING OF RECEPTACLES

Bernd Hansen, Heerstrasse 16, 7166 Sulzbach-Laufen 2, Fed. Rep. of Germany

Filed Sep. 7, 1989, Ser. No. 403,947

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 3834184

Int. Cl.[5] B65B *47/08, 31/02, 51/14*

U.S. Cl. 53—433 **5 Claims**

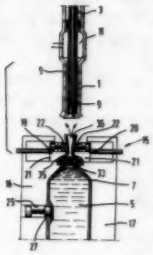
1. A process for filling and sealing an at least partially elastically deformable container of heat sealable material, comprising the steps of:

forming an elastically deformable container with a filler connection having a flow passage with cross-sectional dimensions smaller than a body portion of the container and an open end at a distal end of the filler connection;

filling the container through the open end thereof to a first level of contents;

raising the contents to a higher, second level inside the filler connection of the container by elastically deforming the container;

in a first heat sealing step, reforming the filler connection to reduce the transverse cross-sectional dimensions of the flow passage by pressing flat and heat sealing a border zone of the filler connection after filling, the passage remaining open at the distal end thereof;



in a second heat sealing step, closing and sealing the distal end of the passage after raising the contents to the second level; and

between starting to raise the contents to the second level and starting the second heat sealing step, removing vapors, clouds or foams from an upper surface of said contents in the filler connection by suction by applying reduced pressure in the filler connection.

4,926,614

PACKAGING METHOD AND APPARATUS

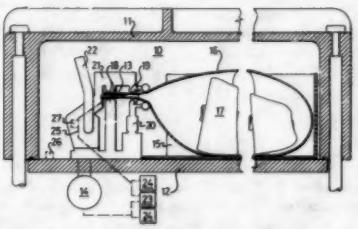
Anthony W. Costello, Howick; Graeme J. Ogg, Murrays Bay, and John C. McGregor, Mangere, all of New Zealand, assignors to RMF Steel Products Co., Grandview, Mo.

Continuation of Ser. No. 117,287, Nov. 4, 1987. This application Sep. 15, 1989, Ser. No. 408,442

Claims priority, application New Zealand, Nov. 5, 1986, 218186; Jul. 23, 1987, 221180

Int. Cl.[5] B65B *31/02, 31/06*

U.S. Cl. 53—434 **6 Claims**



1. A method for packaging a product in a flexible container, said method including the steps of:

placing the product within a flexible container having a closable opening, the flexible container being substantially impermeable to oxygen in normal use,

attaching the flexible container to a snorkel having a first gas passageway and closing the opening of the container about the snorkel by a pair of elongate clamping elements so that the first gas passageway communicates with the interior of the then closed container,

providing a pair of elongate sealing members adjacent the clamping elements but beyond the end of the snorkel,

closing a chamber about the flexible container to contain the snorkel, the clamping elements, the sealing members, and the flexible container so that the flexible container is entirely contained within the chamber but is isolated from gas within the chamber by the flexible container being closed about the snorkel,

controlling the evacuation of gas from within the chamber and substantially simultaneously evacuating the flexible container via the first gas passageway to control the evacuation of the flexible container and prevent premature collapsing of the flexible container to substantially entirely remove all of the gas from within the flexible container, and

injecting a selected gas into the flexible container, and at the same time refilling the chamber with air or other gas, sealing the flexible container and removing the flexible container from the snorkel.

4,926,615

MACHINE FOR FORMING CARTONS AND PACKAGING GOODS THEREIN

Kenneth G. Alexander, MacLeod, Australia, assignor to Alexander Packaging Equipment Pty. Ltd., Eltham and Fibre Containers Pty. Limited, Chullora, both of, Australia

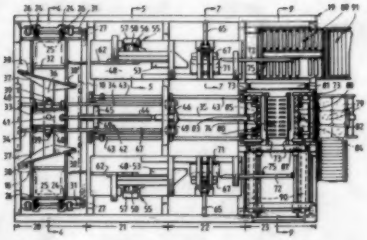
PCT No. PCT/AU87/00329, § 371 Date Jun. 13, 1989, § 102(e) Date Jun. 13, 1989, PCT Pub. No. WO88/03501, PCT Pub. Date May 19, 1988

PCT Filed Sep. 25, 1987, Ser. No. 340,179

Claims priority, application Australia, Nov. 12, 1986, PH8950

Int. Cl.[5] B31B *1/44, 1/52;* B65B *43/10, 49/00*

U.S. Cl. 53—564 **12 Claims**



1. A machine for forming blanks of cardboards or like material into containers around goods to be packaged therein and including a first operating stage where a stack of said blanks are stored and sequentially fed to a forming stage, and a forming stage where said goods are loaded onto a said blank which is then formed into a said container around said goods, characterized in that, said containers are crates and said machine includes an intermediate operating stage (21, 22) incorporating folding apparatus (54, 57, 67) for folding each of two opposed extended end flaps (14*a*) of said blank (10) back on themselves to form a reinforcing structure including a ledge (12) which, in a formed crate extends across each of two opposed ends (14) of the crate towards the upper edge of said opposed ends and directed inwardly of said crate.

4,926,616

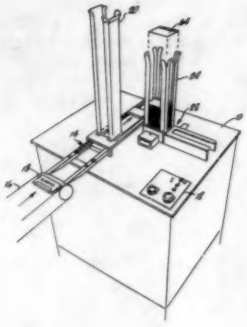
CASSETTE PACKAGING SYSTEM

Darrell W. Zielke, Valencia, and Kenneth D. Dean, Sepulveda, both of Calif., assignors to Paktec Automation, Valencia, Calif.

Filed Feb. 1, 1989, Ser. No. 305,243

Int. Cl.[5] B65B *9/10, 43/32, 5/04*

U.S. Cl. 53—585 **19 Claims**



1. A mechanism for packaging tape cassettes in sleeves, each sleeve having two opposed wide sides and two opposed narrow sides to closely fit the cassettes, comprising

a frame;

a guideway mounted to said frame and sized to receive cassettes therein, said guideway including a packaging station;

a loading track on said frame extending to said packaging station, said loading track having guidewalls extending along said loading track and standing upwardly from said loading track on either side thereof and flanges extending toward one another from said guidewalls, said flanges and said guidewalls forming opposed channels having first ends distant from said packaging station and second ends proximate to said packaging station, said guidewalls mutually converging toward said packaging station and being spaced one from the other at said first ends to be as wide as two adjacent sides of the sleeves lying in a plane and at said second ends to be slightly narrower than a wide side of the sleeves;

a sleeve pusher mounted to said frame to reciprocate along said track and between said guidewalls.

4,926,617

APPARATUS FOR WRAPPING ROUND BALES

Michael D. Van Mill, Shell Rock, Iowa, assignor to Unverferth Manufacturing Co., Inc., Kalida, Ohio

Filed Jan. 23, 1989, Ser. No. 300,959

Int. Cl.[5] B65B *11/04*

U.S. Cl. 53—587 **16 Claims**

1. An apparatus for wrapping a round hay bale with a continuous sheet of wrapping material, comprising:

a load supporting frame;

mounting bracket means attached to said frame and adapted to be coupled to a vehicle;

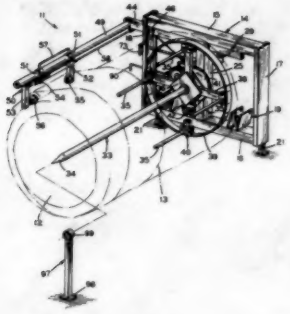
a spindle rotatably mounted on said frame and adapted to be inserted along a longitudinal axis of a round hay bale;

spinner plate means rotatably mounted on said frame and adapted to engage a round hay bale on said spindle for rotating the bale about its longitudinal axis;

a dispenser arm attached to said frame and extending generally parallel to said spindle;

a dispenser assembly slidably attached to said arm and adapted to retain a source of a continuous sheet of wrapping material;

control means coupled to said spinner plate for rotating said spinner plate and moving said dispenser assembly along said dispenser arm to wrap said sheet material around the bale; and



a cable winding means rotatably attached to said frame, a cable connected between said dispenser assembly and said winding means, and means for selectively coupling said winding means to said control means for rotating said winding means and moving said dispenser assembly.

4,926,618

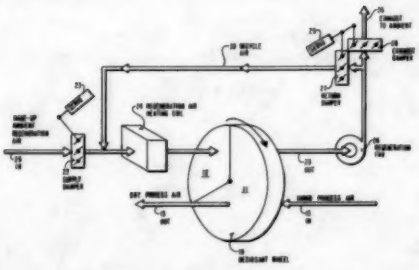
INDUSTRIAL DEHUMIDIFIER

Charles Ratliff, 49 Ridgeway Dr., Brownsburg, Ind. 46112

Filed Jan. 3, 1989, Ser. No. 292,822

Int. Cl.[5] B01D *53/06*

U.S. Cl. 55—20 **14 Claims**



1. A method of operating a rotating sorption bed system having a mass of thermally regenerable sorbent material divided into a process sector and a regeneration sector, said method comprising the continuous steps of:

flowing a process fluid stream through the process sector;

controllably flowing a regenerant fluid stream through the regeneration sector to regenerate the sorbent material;

controllably heating the regenerant fluid stream upstream of the regeneration sector;

controllably recirculating a variable recycle stream portion of the regenerant fluid stream downstream of the regeneration sector for at least one additional pass through the regeneration sector.

4,926,619

HAY-MAKING MACHINE

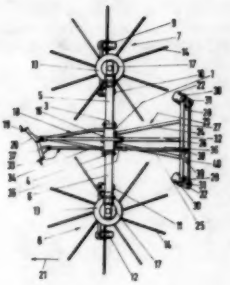
Josef Ungruh, Rheine, and Maximilian Rohlmann, Hörstel-Riesenbeck, both, Fed. Rep. of Germany, assignors to H. Niemeyer Söhne GmbH & Co. KG, Hörstel-Riesenbeck, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 272,144

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1987, 8715405

Int. Cl.[5] A01B *73/02*; A01D *80/00, 78/10*

U.S. Cl. 56—15.4 **10 Claims**



1. A hay-making machine moveable along a straight line path and a curved path, comprising a central support, elongated transverse supports pivotably connected to said central support and extending from opposite sides of said central support in a direction generally perpendicular to said straight line path, rake means on each of said transverse supports, ground-support wheels on each of said transverse supports, drawbar means connected to said central support and extending generally forwardly of said central support, said drawbar means being connectable to a tractor vehicle, undercarriage means connected to said central support and extending generally rearwardly of said central support, running wheels rotatably mounted on said undercarriage means, pivotal means pivotably supporting said running wheels for pivotable movement about generally vertical axes, and a steering means operably connected between said pivotal means and said draw bar means for pivoting and steering said running wheels in response to alignment changes between the hay-making machine and the tractor vehicle connected to said drawbar means.

4,926,620

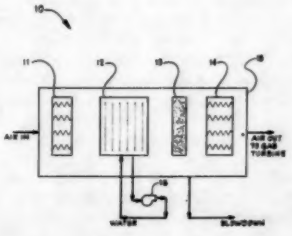
CLEANING GAS TURBINE INLET AIR

David W. Doule, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jul. 8, 1988, Ser. No. 217,006

Int. Cl.[5] B01D *47/06*

U.S. Cl. 55—89 **11 Claims**



1. A process for removing particulate and volatile contami-

nants from inlet air passing to a gas turbine comprising contacting the air with a stream of water at a rate sufficient to reduce the contaminants present in the air by passing the air through a spray pattern or a substantially flat wall of finely atomized water formed by at least a pair of opposing spray streams whereby the streams impact each other to fan out creating the wall of water.

4,926,621

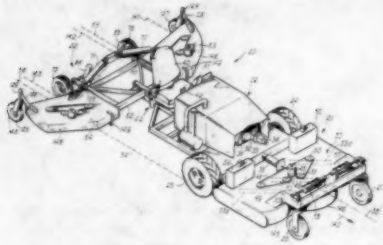
MOWING TRACTOR WITH TOWED MOWER

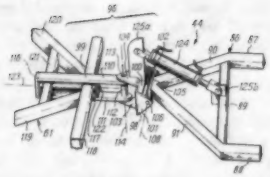
Robert M. Torras, 101 Gould St., Simons Island, Ga. 31522

Continuation-in-part of Ser. No. 197,094, May 20, 1988, abandoned, and a continuation-in-part of Ser. No. 914,712, Oct. 2, 1986, Pat. No. 4,876,846. This application Dec. 7, 1988, Ser. No. 281,061

Int. Cl.[5] A01D *75/30*; A01B *59/04*

U.S. Cl. 56—6 **24 Claims**





1. In combination a self propelled front mower and a towed rear mower for cutting grass and other vegetation, said front mower comprising rear driving wheels engaging the ground surface for moving the front mower in a forward direction and front cutter means arranged for cutting a swath in the grass and like vegetation beneath the front mower, said rear mower including a support frame extending laterally on opposite sides of the swath to be cut by said front mower, wheel means supporting said support frame on the ground surface, rear cutters mounted to said support frame and spaced from each other on opposite sides of the swath cut by said front mower a distance to cut swaths in the grass and the like beneath the rear mower that partially overlap the swath cut by said front mower, connecting means for connecting said rear mower to said front mower in trailer fashion for allowing said rear mower to pivot with respect to said front mower about a substantially upright axis, the dimensions between the upright axis of said connecting means and the rear driving wheels of said front mower, and between the upright axis of said connecting means and the wheels means of the support frame of said rear mower, and the placement of the front cutter means and of the rear cutters of the support frame of said rear mower are selected to cause the rear cutters to straddle and overlap the swath cut by the front cutter means as the front mower and towed rear mower move through a turn, and power means for driving said driving wheels, said front cutter means and said rear cutters.

4,926,622

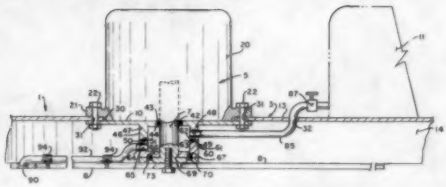
COMBINED ROTARY CUTTER AND HERBICIDE APPLICATOR AND METHOD

Robert L. McKee, Rte. 1, Box 138, Maynard, Ark. 72444

Filed Apr. 3, 1989, Ser. No. 331,823

Int. Cl.[5] A01C *15/00*; A01D *34/82*

U.S. Cl. 56—16.8 **10 Claims**



1. In a rotary vegetation cutter with a rotating shaft, a plurality of cutting blades extending substantially radially from said shaft and power means for rotating said shaft, the improvement comprising means for feeding herbicide adjacent a cutting portion of at least one of said blades while said blades are rotated, whereby said herbicide is applied to vegetation as it is cut, said herbicide feeding means including a reservoir for said herbicide, a distributor manifold concentric with said shaft, tube means from said reservoir to said manifold, and feed conduit means from said manifold to port means opening along at least one of said blades radially inboard of a radially outer end of said blade, said distributor manifold including a cup mounted on and around said shaft adjacent said blade for rotation therewith, a collar fixed against rotation axially above said cup, and seal means between said cup and said collar, said tube means communicating with the interior of said collar and said feed conduit means communicating with the interior of said cup.

4,926,623

MOWING APPARATUS

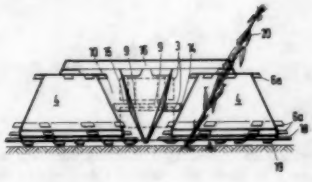
Josef Fiener, Mindelheim, Fed. Rep. of Germany, assignor to Karl Mengele & Söhne Maschinenfabrik und Eisengiesserei GmbH & Co., Guenzburg/Donau, Fed. Rep. of Germany

Filed Apr. 8, 1988, Ser. No. 179,472

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1987, 3712507

Int. Cl.[5] A01D *45/02*

U.S. Cl. 56—60 **3 Claims**



1. A mowing apparatus for moving stalk-like crops independently of rows and for conveying the mowed crop to a draw-in box of a chopper, comprising:

rotatable mowing rollers each having a conical upwardly directed outer shape and rigid entrainment fingers which have tips which define a tip path during rotation of said mowing rollers; and

rotatable wipe-off rollers each having a conical downwardly directed outer shape and wipe-off fingers which have tips which define a tip path during rotation of said wipe-off

rollers, said wipe-off rollers cooperating with said mowing rollers by an overlapping of the tip paths of said entrainment fingers and said wipe-off fingers, said conically shaped mowing rollers and wipe-off rollers being arranged so as to form a sideways inclined draw-in channel in front of the draw-in box.

4,926,624

LAWN MOWER

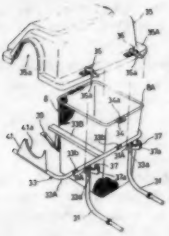
Masatake Murakawa; Niro Bando, both of Sakai; Masatsugu Tone, Hashimoto; Mikio Yuki, Kawachinagano; Junji Miyata, Kyoto; Tetsuaki Hayashi, Osaka, and Kazuaki Kurohara, Sakai, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Continuation of Ser. No. 109,967, Oct. 19, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 333,753

Claims priority, application Japan, Oct. 21, 1986, 61-251290; Oct. 21, 1986, 61-161736[U]; Oct. 21, 1986, 61-161737[U]

Int. Cl.[5] A01D *34/70*

U.S. Cl. 56—202 12 Claims



1. A lawn mower including a pair of grass catchers and means for mounting the grass catchers, the lawn mower having a pair of right and left frame members defining main frames, the mounting means comprising:

(a) end openings provided at at least rear end regions of the respective frame members, the end openings extending along a center line longitudinally of the mower and opening rearwardly,

(b) a pair of L-shaped connecting members formed of pipes, one leg of each of the L-shaped members having a distal end insertable into a respective one of the end openings such that the other leg of the respective L-shaped member is vertically arranged,

(c) fixing means for rigidly retaining connected portions of the connecting members inserted into the end openings, and

(d) a support member for mounting the pair of grass catchers, the support member having a frame structure and including engaging elements remote from each other for being removably connected to the vertical legs of the respective connecting members, thereby defining a space between the connecting members and maintaining the support member substantially horizontal, each of the grass catchers having a top opening and a mouthpiece extending along the periphery of the top opening, the mouthpiece resting upon the frame structure and the frame structure thereby supporting the grass catchers.

4,926,625

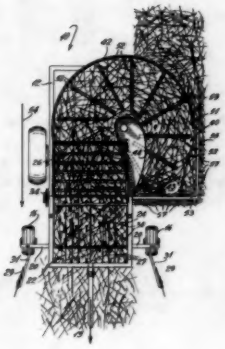
WINDROW TURNING APPARATUS

Yves Laquerre, Ste-Therese, Canada, assignor to B. & R. Choiniere Limited, Quebec, Canada

Continuation-in-part of Ser. No. 30,140, Mar. 26, 1987, Pat. No. 4,777,788. This application Aug. 23, 1988, Ser. No. 235,098

Int. Cl.[5] A01D *76/00, 78/00, 80/00, 84/00*

U.S. Cl. 56—376 12 Claims



1. An apparatus for inverting a windrow of material such as hay or the like in a delicate manner, comprising:

a carriage including (a) means for enabling a forward motion thereof parallel to the windrow of said material lying upon the surface of the ground, (b) a front portion, and (c) skid means mounted on said front portion and slidingly engaging the surface of the ground;

windrow pick-up means mounted on said carriage, said windrow pick-up means extending from a point adjacent to the ground to an elevated position for picking up the windrow and for elevating progressively said windrow from the ground;

a windrow turner including a rotatable platform mounted onto said carriage adjacent said windrow pick-up means for receiving windrowed material from said windrow pick-up means and for moving the received windrowed material along an approximately circular path, said rotatable platform having a roughened upper surface constituting mechanical anti-slipping means for reducing slippage of said material thereon; and

a discharge mouth portion on said carriage adjacent said rotatable platform through which material is deposited on the ground in inverted condition from said rotatable platform by the forward motion of said carriage, the material being supported on said windrow pickup means and on said rotatable platform on the underside to reduce agitation of the upper side thereof.

4,926,626

FLAMME FANCY YARN MANUFACTURING METHOD AND APPARATUS

Blagoy A. Andonov, Sofia, Bulgaria, assignor to N I T I "Veda", Sofia, Bulgaria

Filed Jul. 1, 1988, Ser. No. 214,236

Int. Cl.[5] D02G *3/34, 3/38, 5/32*

U.S. Cl. 57—18 3 Claims

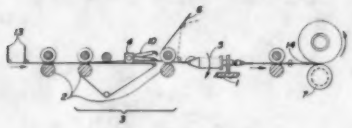
1. A method for producing flamme fancy yarn comprising the steps of continuously feeding at least one sliver of staple fibers at a constant speed into a draft zone;

drawing the sliver in the draft zone, and simultaneously applying a force with permanent action to the sliver at an angle toward the trajectory of the sliver path;

breaking the thinning sliver being drawn under the action of

said force, and simultaneously adding the broken tuft of the sliver to a core thread;

extending, after each breaking of drawing sliver, the trajectory of the sliver path of the remaining broken sliver, fed without drawing into the draft zone;



recapturing the sliver remaining in the draft zone by front end delivery rollers, stretching the sliver in the draft zone and subjecting the sliver to a new drawing;

binding together the tuft and core thread and subsequent winding the ready-made yarn.

4,926,627

DEVICE TO FEED AND OPEN A FIBER SLIVER ON AN OPEN-END SPINNING DEVICE

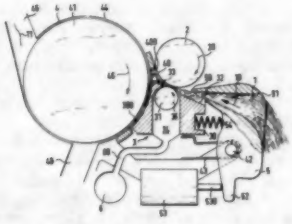
Erwin Braun, Ingolstadt; Michael Strobel, Munich, and Rupert Karl, Ingolstadt, all of Fed. Rep. of Germany, assignors to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany

Filed May 11, 1989, Ser. No. 350,214

Claims priority, application Fed. Rep. of Germany, May 20, 1988, 3817346

Int. Cl.[5] D01H *7/895*; D01G *15/20*

U.S. Cl. 57—412 **21 Claims**



1. A feeding device for feeding a fiber sliver to an open-end spinning device having an opening roll, comprising:

(a) a feed roll driven in a direction to feed said fiber sliver to said opening roll;

(b) a feed tray disposed opposite said feed roll for supporting said fiber sliver;

(c) a recess in said feed tray in communication with said feed roll;

(d) a pressure roll disposed in said recess in a position to press said fiber sliver into contact with said feed roll, and supported for rotation in a direction to assist said feed roll in feeding said fiber sliver to said opening roll; and

(e) guide walls disposed on the sides of said feed tray adjacent to each end of said pressure roll for confining and guiding said fiber sliver between said feed roll and said pressure roll.

4,926,628

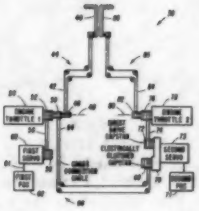
AUTOMATIC FUEL CONTROL AND ENGINE SYNCHRONIZER SYSTEM AND APPARATUS

Dan S. Veerhusen, and David C. Pattison, both of Cedar Rapids, Iowa, assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 915,167, Oct. 3, 1986, Pat. No. 4,805,396. This application Dec. 9, 1988, Ser. No. 282,430

Int. Cl.[5] F02C *6/00*

U.S. Cl. 60—39.15 **2 Claims**



1. An automatic, independent, redundant, and computer controlled engine fuel control system for aircraft of the type having at least a first rear mounted engine, disposed in the aft portion of said aircraft and having a first engine throttle and a second rear mounted engine disposed in the aft portion of said aircraft and having a second engine throttle, comprising in operative combination:

a. first servo for controlling the first engine throttle said first servo means being disposed in the aft portion of said aircraft;

b. second servo means for controlling the second engine throttle said second servo means being disposed in the aft portion of said aircraft;

c. means for selectively connecting the first servo means with the second servo means so that during normal operations a manipulation of the first servo means does not effect the second servo means, but upon demand, the first servo means can be selectively connected, in at least two directions, with the second servo means, so that a manipulation of the second servo means, in either direction, will result in a manipulation of the first engine throttle said means for connecting being coupled with said first and second servo means and further wholly disposed in the aft portion of said aircraft.

4,926,629

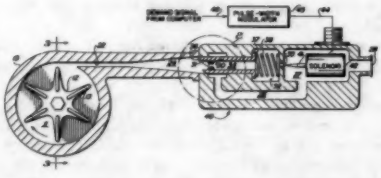
LOW COST FUEL SUPPLY SYSTEM FOR GAS TURBINE ENGINES

Christopher D. Eick, Phoenix; Kenneth P. Worcester, Tempe, and John R. Williamson, Paradise Valley, all of Ariz., assignors to Allied-Signal Inc., Phoenix, Ariz.

Filed Oct. 28, 1988, Ser. No. 264,235

Int. Cl.[5] F02C *9/26*

U.S. Cl. 60—39.281 **10 Claims**



1. Apparatus for supplying and metering fuel to a gas turbine engine, comprising in combination:

vortex pump means for supplying flow of said fuel through

a diffuser at substantially constant pressure regardless of flow rate;

a fuel metering body having an inlet, an outlet and a first fuel flow path providing fluid communication between said inlet and said outlet, said inlet being in fluid communication with said diffuser to receive said flow of fuel from said pump and said outlet being in flow communication with said engine;

said body also having therein a variable pressure cavity, a second flow path providing fluid communication between said inlet and said pressure cavity, and an orifice providing communication between said cavity and said outlet;

a metering spool slidably disposed in said body to define a variable flow metering area between said inlet and said first flow path;

means, disposed in said pressure cavity for biasing said spool in a direction tending to decrease said flow area: and

means, responsive to electrical signals indicating fuel demand for said engine, for variably blocking said orifice;

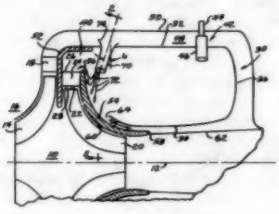
whereby said flow area varies proportionally to a difference between fuel pressure in said variable pressure cavity and said substantially constant pressure.

4,926,630

JET AIR COOLED TURBINE SHROUD FOR IMPROVED SWIRL COOLING AND MIXING

Jack R. Shekleton, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 12, 1988, Ser. No. 283,071
Int. Cl.[5] F23R 3/16, 3/54
U.S. Cl. 60—39.36 **10 Claims**



1. A radial inflow turbine comprising:

a rotor rotatable about an axis and having a compressor section having a compressed air outlet and a turbine wheel section;

an annular combustor disposed about said turbine wheel section and including spaced radially inner and outer walls connected at one end by a radial directed wall, the opposite end defining a hot gas outlet;

a rear turbine wheel shroud in adjacency to said turbine wheel at the radially inner side of said hot gas outlet and extending toward said radially outer wall for confining hot gases of combustion against said turbine wheel;

a turbine nozzle in fluid communication with said hot gas outlet and connected to said rear turbine shroud near the radially outer edge thereof for directing hot gas of combustion from said combustor against said turbine wheel to drive the same; and

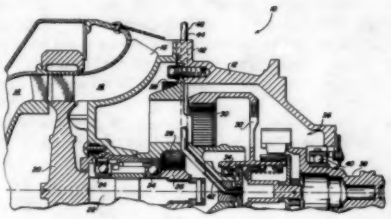
a plurality of inwardly directed tubes disposed across said hot gas outlet and in fluid communication with said compressed air outlet and extending at least almost to said turbine shroud radially outer edge to direct compressed air against said rear turbine shroud to cool the same.

4,926,631

PAWL AND RATCHET CLUTCH AND AIR TURBINE STARTER HAVING SUCH A CLUTCH

Kal K. Sorenson, Tempe, Ariz., assignor to Allied-Signal, Inc., Morristown, N.J.

Division of Ser. No. 165,664, Mar. 8, 1988. This application Jun. 14, 1989, Ser. No. 366,084
Int. Cl.[5] F02C 7/277
U.S. Cl. 60—39.142 **7 Claims**



1. A pawl and ratchet clutch mechanism between a driving element rotating in response to a flow of pressurized fluid and a rotatable driven element, comprising:

ratchet means secured for rotation with the driving element;

pawl means mounted on the driven element for movement to engage said ratchet means to transmit rotary movement of the driving element to the driven element, said pawl means being responsive to centrifugal force resulting from rotation of the driven element to tend toward disengagement from said ratchet means;

movable stop means for in a first position stopping said pawl means from engaging said ratchet means, said stop means moving to a second position allowing engagement of said ratchet means by said pawl means; and

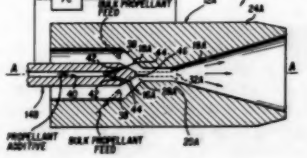
said driving element defining a bore, a piston member sealingly and movingly received in said bore and cooperating with said driving element to define a variable-volume chamber, flow path means communicating said pressurized fluid to said variable-volume chamber to move said piston member in a first direction, and means coupling said piston member with said stop means to move the latter to said second position in response to movement of said piston member in said first direction.

4,926,632

PERFORMANCE ARCJET THRUSTER

Richard D. Smith, Kirkland; Steve Knowles, Seattle; R. J. Cassady, Bellevue; William Smith, Seattle, and Mark A. Simon, Redmond, all of Wash., assignors to Olin Corporation, Stamford, Conn.

Filed Feb. 1, 1988, Ser. No. 150,591
Int. Cl.[5] F02K 11/00
U.S. Cl. 60—203.1 **21 Claims**



1. In an arcjet thruster, the combination comprising:

(a) a body forming an annular-shaped constrictor and an annular-shaped nozzle being tandemly-arranged and hav-

ing respective surfaces which together define an arc chamber, at least said nozzle being electrically conductive to constitute an anode;

(b) an elongated member having a tip disposed adjacent to and spaced upstream from said constrictor, said member being electrically conductive to constitute a cathode spaced from said anode by a gap generally coextensive with said arc chamber;

(c) means for applying an electrical potential to said anode and cathode so as to generate an electrical arc in said arc chamber from said cathode to said anode which produces thermal heating of propellant gases flowing through said chamber and expansion thereof through said nozzle; and

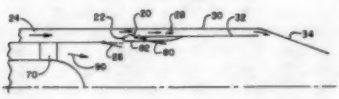
(d) means for supplying a propellant gas blend composed of a higher molecular weight propellant having a first specific impulse and a lower molecular weight propellant having a second specific impulse greater than said first specific impulse to said arc in said arc chamber.

4,926,633

COOLANT PRESSURE REGULATING APPARATUS

Dudley O. Nash, Cincinnati, and Frederick C. Herzner, Fairfield, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 27, 1989, Ser. No. 372,416
Int. Cl.[5] F02K *3/04*
U.S. Cl. 60—226.1 **8 Claims**



1. A coolant pressure regulating apparatus in the exhaust system of an aircraft turbine engine comprising in combination:

an engine casing enclosing a turbine and extending downstream therefrom to an exhaust nozzle, said engine casing between said turbine and said exhaust nozzle enclosing a fan duct which operatively communicates with said turbine and said exhaust nozzle, said fan duct located inside the outer periphery of said engine casing and enclosing a core air flow channel, said core air flow channel directing air from said turbine to said exhaust nozzle,

a closed cavity suppressor operatively arranged along the inner surface of said fan-duct, said closed cavity suppressor having an upper and lower wall, said closed cavity suppressor operatively communicating the coolant air flow from said fan duct into said core air flow channel, and,

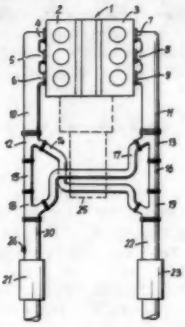
a predetermined number of valves circumferentially arranged in said upper wall of said closed cavity suppressor, each valve of said predetermined number of valves being responsive to the level of pressure of the coolant air in said fan duct, said valve being in the closed position during low coolant air pressure thereby preventing coolant air flow from said fan duct from passing into said closed cavity suppressor, during an excess coolant air pressure operating condition said valve opens to relieve the excess coolant air pressure operating condition and thereby maintaining a desired coolant air pressure in said fan duct.

4,926,634

METHOD AND APPARATUS FOR PRODUCING A HOMOGENEOUS EXHAUST GAS MIXTURE IN AN EXHAUST SYSTEM FOR AN INTERNAL COMBUSTION ENGINE HAVING TWO BANKS OF CYLINDERS

Heiarich Pütz, Much; Friedhelm Nowitzki, Engelskirchen; Gunter Damm, Cologne; Hartmut Bathelt, Weinsberg; Günter Krömer, Heilbronn; Henning Hoffmann, Neckarsulm, and Reiner Pischke, Bad Friedrichshall, all of Fed. Rep. of Germany, assignors to Audi AG, Fed. Rep. of Germany

PCT No. PCT/DE87/00576, § 371 Date May 11, 1989, § 102(e) Date May 11, 1989, PCT Pub. No. WO88/04358, PCT Pub. Date Jun. 16, 1988
PCT Filed Dec. 4, 1987, Ser. No. 353,671
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1986, 3641376; Nov. 27, 1987, 3740238
Int. Cl.[5] F01N *3/28*
U.S. Cl. 60—274 **8 Claims**



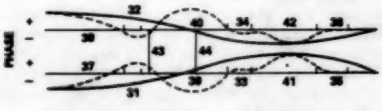
1. Method for the production of a homogeneous exhaust gas mixture in an exhaust system with two catalysts (21, 23) for an internal combustion engine (1) with two cylinder banks (2, 3) and with lambda control of the fuel-air ratio by means of a lambda probe (24) disposed in the exhaust, individual exhaust pipes (4, 5, 6) of the first cylinder bank (2) being combined into a first exhaust manifold (10) and individual exhaust pipes (7, 8, 9) of the second cylinder bank (3) being combined into a second exhaust manifold (11), dividing the exhaust stream of each cylinder bank (2, 3) into two substantially equal partial streams and combining a partial stream from each cylinder bank with a partial stream from the other cylinder bank and feeding the combined stream to a catalyst (21 and 23, respectively).

4,926,635

EXHAUST SYSTEM FOR MULTI-CYLINDER ENGINE

Yuichi Sakuma, Yokosuka, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 3, 1988, Ser. No. 202,000
Claims priority, application Japan, Jun. 8, 1987, 62-143863
Int. Cl.[5] F01N *3/28*; F02B *27/02*
U.S. Cl. 60—299 **10 Claims**



1. An exhaust system for a multi-cylinder engine, comprising:

means for dividing exhaust ports of the engine into first and second groups;

first and second exhaust systems each of which includes a catalytic converter, a muffler and a first tube for fluidly connecting said catalytic converter with said muffler, said catalytic converter of said first exhaust system communicating with said first group exhaust ports, said catalytic converter of said second exhaust system communicating with said second group exhaust ports:

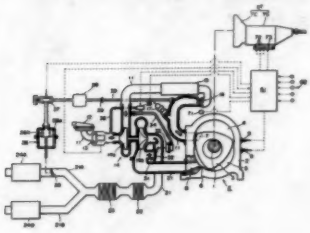
at least one communicating pipe member for communicating said first tubes of said first and second exhaust systems, said communicating pipe member having a first end connected to said first exhaust system first tube at a first predetermined position between said catalytic converter and said muffler, and a second end connected to said second exhaust system first tube at a second predetermined position corresponding to said first predetermined position.

4,926,636

ENGINE-CONTROL APPARATUS

Tomoo Tadokoro; Seiji Tashima; Haruo Okimoto; Toshimichi Akagi; Masami Nakao; Ikuo Matsuda, and Eisosuke Suekuni, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Feb. 14, 1989, Ser. No. 309,847
Claims priority, application Japan, Feb. 18, 1988, 63-34037
Int. Cl.[5] F02B *27/02, 75/10*
U.S. Cl. 60—312 **21 Claims**



1. An engine-control apparatus comprising:

a plurality of sound deadening passages mounted on an exhaust passageway of an engine;

a shift valve mounted on the exhaust passageway and adapted to switch a flow of exhaust gases between a first state and a second state by changing the flow of exhaust gases through at least a portion of the plurality of the sound deadening passages, the first state being a state in which pressure of the exhaust gases is decreased and the second state being a state in which pressure of the exhaust gases is increased;

a switching control means for controlling the switching of the shift valve on the basis of a predetermined switching characteristic in accordance with a state of running the engine; and

a torque regulating means for regulating a change in torque to be transmitted to a driven wheel at the time of switching the shift valve by the switching control means.

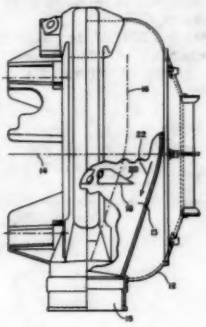
4,926,637

EXHAUST CONFIGURATION

James Gassen, Charlotte, N.C., assignor to Textron Inc., Providence, R.I.

Filed Sep. 19, 1988, Ser. No. 245,569
Int. Cl.[5] F01N *3/02*
U.S. Cl. 60—317 **10 Claims**

1. An exhaust configuration for a blower having a volute housing including a volute duct and a volute opening through which air exits the apparatus and a gas engine having an exhaust system through which an exhaust stream leaves the engine comprising: means for coupling and merging the exhaust stream with the air stream within the volute duct so that



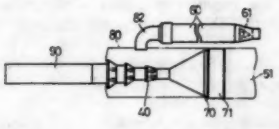
the air stream flows into the exhaust stream for increasing the back pressure of the exhaust stream.

4,926,638

NEGATIVE PRESSURE AIR STREAM ACCELERATOR OF SUCTION TYPE AIR COOLING MECHANISM FOR INTERNAL COMBUSTION ENGINE

Yoshiaki Kakuta, 1-8-1, Hamakawado, Kasukabe-Shi, Saitama-Ken, Japan

Filed Jun. 24, 1988, Ser. No. 210,857
Claims priority, application Japan, Dec. 3, 1987, 62-306684
Int. Cl.[5] F02B *35/00*
U.S. Cl. 60—319 **18 Claims**



1. A negative pressure air stream generator for a suction type air cooling mechanism of an internal combustion engine for drawing atmospheric air through the cooling mechanism by negative pressure produced by the exhaust gas stream in the exhaust system comprising:

a continuous tubular acceleration means having a reducing section for decreasing the cross-sectional area and increasing velocity of the exhaust gas stream, and at least two stages, each stage comprising a volume increasing section for increasing the cross-sectional area of the exhaust gas stream downstream of said reducing section, and a substantially constant diameter axially extending section downstream of said volume increasing section;

a casing surrounding said acceleration means;

a duct having a front end connected to the air cooling mechanism and a rear end connected to said casing and communicating with the interior thereof; and

means communicating the interior of said casing with the exhaust gas stream passing through said volume increasing section of each of said stages.

4,926,639

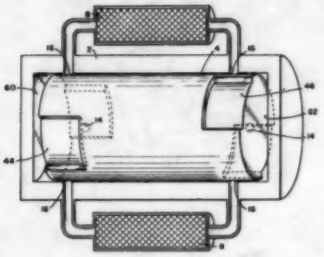
SIBLING CYCLE PISTON AND VALVING METHOD

Matthew P. Mitchell, Berkeley, and Luc Bauwens, Oakland, both of Calif., assignors to Mitchell/Stirling Machines/Systems, Inc., Berkeley, Calif.

Continuation of Ser. No. 300,855, Jan. 24, 1989, abandoned. This application Oct. 10, 1989, Ser. No. 420,669

Int. Cl.[5] F02G 1/04

U.S. Cl. 60—522 7 Claims



1. In a device of the Stirling Cycle type for converting energy between heat and work comprising:

compression and expansion chambers,

means for decreasing the volume of one of the chambers while increasing the volume of the other chamber,

gas storage means comprising first and second regenerator means, each connected to the expansion chamber and to the compression chamber,

a quantity of compressible gas confined for circulation through the chambers and gas storage means,

control means for communicating the first regenerator means only to the expansion chamber while communicating the second regenerator means only to the compression chamber and subsequently communicating the second regenerator means only to the expansion chamber while communicating the first regenerator means only to the compression chamber with intermediate steps of closing one of the regenerator means while exchanging fluid between the chambers through the other regenerator means,

means for conducting heat into the expansion chamber, and means for conducting heat out of the compression chamber, the improvement comprising:

a double acting piston mounted for synchronous reciprocation and rotation for increasing and decreasing the volumes of the chambers through the reciprocation and for operating said control means through the rotation.

4,926,640

SUPERCHARGING PRESSURE CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

Inoue Kazuo; Kishi Noriyuki; Kubodera Masao; Akiyama Eitetsu; Kashiwabara Shigeto, and Takizawa Osamu, all of Wako, Japan, assignors to Honda Motor Co., Ltd., Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,863

Claims priority, application Japan, Dec. 29, 1987, 62-334198; Dec. 29, 1987, 62-334199; Mar. 18, 1988, 63-65320; May 11, 1988, 63-114101; May 11, 1988, 63-114100; May 12, 1988, 63-115706; Jul. 19, 1988, 63-179452

Int. Cl.[5] F02B 37/12

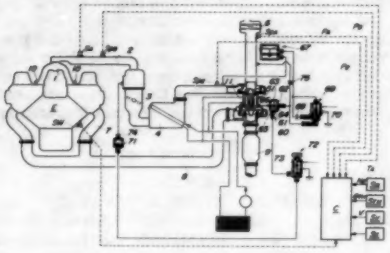
U.S. Cl. 60—602 5 Claims

1. A method of controlling supercharging pressure in an internal combustion engine having a transmission and a supercharger, wherein the supercharging pressure created by said supercharger is controlled in dependence on operating conditions of said engine,

the method comprising the steps of:

(1) detecting a rate of rise of the supercharging pressure in a transient state;

(2) detecting a gear position of said transmission; and



(3) when the detected gear position is a predetermined lower speed position which is a first speed position, correcting the rate of rise of said supercharging pressure in said transient state to a value lower than a value assumed when the detected gear position is a higher speed position.

4,926,641

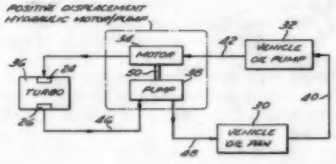
TURBOCHARGER LUBRICATION SYSTEM

Robert A. Keller, 1604 Camberwell Pl., Westlake Village, Calif. 91361

Filed Jan. 11, 1989, Ser. No. 296,186

Int. Cl.[5] F01M 11/04; F02B 37/00

U.S. Cl. 60—605.3 15 Claims



1. In an internal combustion engine having an oil pump for lubricating said engine and a turbocharger for increasing engine performance, the turbocharger having an oil inlet port and an oil outlet port, a lubrication system for supplying and removing lubricating oil to the turbocharger comprising:

motor means fluidically coupled to and driven by said oil pump of the internal combustion engine for supplying positive pressure oil flow to the oil inlet port of said turbocharger; and

pump means mechanically coupled to and driven by said motor means for providing a positive vacuum oil flow from the oil outlet port of said turbocharger.

4,926,642

INTERNAL COMBUSTION ENGINE CHARGING UNIT

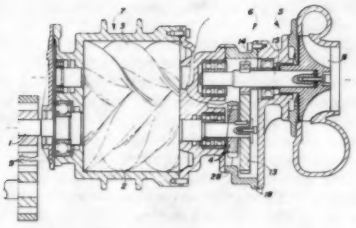
Peter Buthmann, Gelsenkirchen, and Joachim Kotzur, Oberhausen, both of Fed. Rep. of Germany, assignors to MAN Gutehoffnungshütte, GmbH, Oberhausen, Fed. Rep. of Germany

Division of Ser. No. 241,024, Sep. 2, 1988. This application Oct. 4, 1989, Ser. No. 416,849

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729583; Dec. 5, 1987, 3741286

Int. Cl.[5] F02B 37/10

U.S. Cl. 60—607 3 Claims



1. An internal combustion engine charging arrangement, comprising:

a screw charger including a main rotor rotating about a main rotor shaft and a secondary rotor rotating about a secondary rotor shaft;

a synchronizing gearing means connected to said main rotor shaft and connected to said secondary rotor shaft for synchronizing the rotation of said main rotor and said secondary rotor;

an exhaust gas turbine having an intake connected to an exhaust of the internal combustion engine, said exhaust gas turbine being mounted on an exhaust gas turbine shaft; and,

transmission gearing means connected to said synchronizing gearing unit and connected to said exhaust gas turbine, said transmission gearing means and said synchronizing gearing unit being arranged on one side of said screw charger in a common casing, said exhaust gas turbine shaft having a gear element of said transmission gearing means fixed thereto, another gear element of said transmission gearing means and a gear element of said synchronizing gearing means being fixed on a single shaft.

4,926,643

CLOSED LOOP SYSTEM WITH REGENERATIVE HEATING AND PUMP-DRIVEN RECIRCULATION OF A WORKING FLUID

Barry Johnston, 2423 Pickwick Rd., Baltimore, Md. 21207

Filed Jul. 19, 1989, Ser. No. 381,909

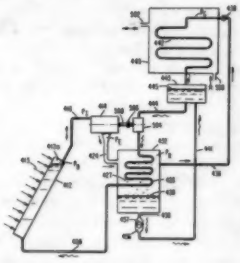
Int. Cl.[5] F01K 7/34

U.S. Cl. 60—691 14 Claims

1. A closed loop thermodynamic system, wherein a recirculating working fluid cyclically undergoes changes between its liquid and vapor phases during which energy received from an external energy source is utilized to vaporize the working fluid at a high pressure in a vaporizing means and the high pressure vapor is utilized in an energy-utilizing means and is exhausted therefrom, various components of the system being located at different heights relative to each other, comprising:

thermal regeneration means for providing regenerative heating of a flow of working fluid in the form of a condensate that is at a pressure not less than an operating pressure of said vaporizing means, said regeneration means being formed to have a first portion and a second portion separated therefrom by a heat-conducting wall, said first portion being formed to convey said condensate therethrough to regeneratively heat the same, said second portion being connected to said energy utilizing means to receive said exhausted vapor to transfer therefrom a portion of the enthalpy thereof across said heat conducting wall to said condensate flow through said first portion, said second portion of said regenerative means also being provided with a vapor outlet and being formed in part to hold a pool of liquid working fluid formed by condensation of a first portion of said exhausted vapor that has condensed due to said energy transfer therefrom, said pool having an outlet with a one-way outflow valve;

vapor condensing means connected to said vapor outlet of said regeneration means to receive therethrough such of said exhausted vapor as did not condense in said first portion, to condense the same by a further transfer of thermal energy therefrom;



condensate-holding means for holding condensate formed in said condensing means, said condensate-holding means also being connected to said valve of said regeneration means to receive condensate therethrough from said pool and being connected to said first portion of said regeneration means to provide said flow of condensate to be heated in flowing therethrough; and

condensate pressurizing means intermediate said condensing means and said first portion of said regeneration means to raise a pressure of said first flow of condensate to a value not less than said operating pressure of said vaporizing means.

4,926,644

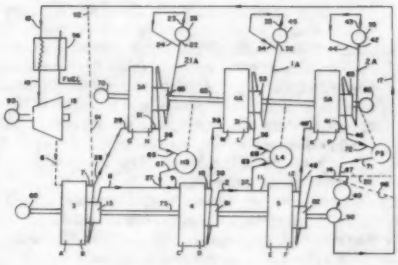
POWER PLANT WITH MEDIUM AND LOW POWER PLANT SYSTEMS

Demos Papastavros, 2429 NE. 184 Ter., North Miami Beach, Fla. 33160

Continuation-in-part of Ser. No. 150,636, Feb. 1, 1988, Pat. No. 4,894,984. This application Oct. 16, 1989, Ser. No. 422,250

Int. Cl.[5] F01K 19/02, 21/00

U.S. Cl. 60—715 13 Claims



1. In a power plant system having a medium power plant

system and a low power plant system with individual closed loops in which each of the medium power plant systems and the low power plant system with individual closed loops containing:

a plurality of N turbine housings, where N is a whole number greater than one, each having a fluid inlet and a fluid outlet, each of said turbine housings containing a power turbine having a fluid inlet and a fluid outlet and being operatively connected to a first shaft which connects all said power turbines, each of said turbine housings also containing a compressor turbine having a fluid inlet and a fluid outlet and being operatively connected to a second shaft said second shaft is operatively connected to a gear housing system and is designed to allow said compressor turbine to rotate independently of said power turbine, therefore said power turbine and said compressor turbine are located and operate inside each of said plurality of N turbine housings, each of said plurality of N turbine housings having a first fluid conduit means operatively connecting said inlet of said turbine housing to said inlet of said power turbine, said first fluid conduit is designed to pass outside the rotor blades of said power turbine, tapering in, decreasing in size from said inlet of said turbine housing to said inlet of said power turbine,

each of said plurality of N turbine housings having a means for allowing working fluid to flow from said outlet of said power turbine to the inlet of said compressor turbine,

each of said plurality of N turbine housings having a second fluid conduit means operatively connecting said outlet of said compressor turbine to said outlet of said turbine housing, said second fluid conduit is designed to pass outside the rotor blades of said compressor turbine, tapering out, increasing in size, from said outlet of said compressor turbine to said outlet of said turbine housing, each of said plurality of N turbine housings having a said gear housing system which consists of a series of individual gears and shafts which are designed to allow said compressor turbine to rotate faster and in an opposite direction from said power turbine,

said medium power plant system comprising the combination of:

said plurality of N turbine housings of the medium power plant system, each having a fluid inlet and a fluid outlet;

a generator means operatively connected to said first shaft of the medium power plant system which connects all of the plurality of N power turbines of the medium power plant system;

a plurality of N heat exchange fluid conduits, where N is a whole number greater than one, each of which having a first fluid passageway which contains hot exhaust fluid and a second fluid passageway which contains cold condensed fluid which flows in an opposite direction than the hot exhaust fluid in said first fluid passageway, a fluid conduit means operatively connecting the following in an open loop cycle, an external source of exhaust heat fluid pressure (heat energy) to the inlet of the first of said plurality of N turbine housings of the medium power plant system, said fluid conduit then operatively connecting the outlet of each of said plurality of N turbine housings of the medium power plant system to said first passageway of one of said plurality of N heat exchange fluid conduits and then to the inlet of the next of said plurality of N turbine housings of the medium power plant system, said fluid conduit then operatively connecting the outlet of the last of said plurality of N turbines of the medium power plant system to the environment;

said low power plant system with individual closed loops consisting of a plurality of N individual closed loops, where N is a whole number greater than one, each of said plurality of N individual closedloops comprising a combination of;

said turbine housing of the low power plant system with individual closed loops, having a fluid inlet and

a fluid outlet;

a condenser having a fluid inlet, a fluid outlet and condensing means between its inlet and its outlet;

a second compressor turbine having a fluid inlet, a fluid outlet and a compressing and circulating means between its inlet and its outlet,

a heat exchange fluid conduit having a first fluid passageway which contains hot exhaust fluid from the outlet of said turbine housing and a second fluid passageway which contains cold condensed fluid from the outlet of said condenser, said cold condenser fluid flowing in an opposite direction than said hot exhaust fluid in said first passageway which is designed to give up heat energy to said second fluid passageway therefore preheating the working fluid;

a fluid conduit means operatively connecting the following in a closed loop cycle, the outlet of said turbine housing to the inlet of the first passageway of said heat exchange fluid conduit, the outlet of the first passageway of said heat exchange fluid conduit, to the inlet of said condenser, the outlet of said condenser to the inlet of the second fluid passageway of said heat exchange fluid conduit, the outlet of the second fluid passageway of said heat exchange fluid conduit to the inlet of said second compressor turbine, the outlet of said second compressor turbine to the inlet of said second fluid passageway of one of the plurality of N heat exchange fluid conduits of the medium power plant system, where the individual closed loop of the low power plant system absorbs additional heat energy from the first fluid passageway of the plurality of N heat exchange fluid conduits of the medium power plant system;

the outlet of said second fluid passageway of one of the plurality of N heat exchange fluid conduits of the medium power plant system to the inlet of said turbine housing representing a complete individual closed loop cycle of the low power plant system;

said low power plant system with individual closed loops also consisting of:

a generator means operatively connected to said first shaft of the low power plant system which connects all of the plurality of N power turbines of the low power plant system:

a starter means operatively connected to said first shaft of the low power plant system.

4,926,645

COMBUSTOR FOR GAS TURBINE

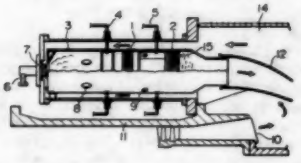
Kazumi Iwai, Mito; Hiromi Koizumi, and Katsuo Wada, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 91,752, Sep. 1, 1987. This application Jul. 31, 1989, Ser. No. 387,146

Claims priority, application Japan, Sep. 1, 1986, 61-203747

Int. Cl.[5] F23R 3/40, 3/34

U.S. Cl. 60—723 2 Claims



1. A catalytic combustor for a gas turbine comprising:

a combustor liner having at an upstream section a head portion provided with a fuel nozzle and at a downstream section a rear portion provided with a tail cylinder;

stages of catalyst layers retained in said combustor liner between said head portion and said rear portion at a predetermined spaced interval in a direction of gas flow in said combustor liner;

a fuel supply nozzle disposed upstream of each of said catalyst layers;

first control means operatively associated with the fuel supply nozzle means most proximate the tail cylinder controlling flow rate of fuel therethrough so that a temperature level at the catalyst layer most proximate the tail cylinder is kept not lower than about 1000° C. and not higher than about 1500° C. independently of a load on the gas turbine; and

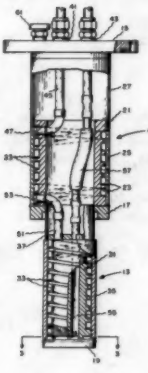
second control means operatively associated with the fuel supply nozzle most proximate the head portion controlling flow rate of fuel therethrough in accordance with the load on the gas turbine.

4,926,646

CRYOGENIC PRECOOLER FOR SUPERCONDUCTIVE MAGNETS

Bizhan Dorri, Clifton Park, and Steven J. Brzozowski, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 10, 1989, Ser. No. 335,268
Int. Cl.[5] F25B *19/00*
U.S. Cl. 62—51.1 **11 Claims**



1. A precooler for initial cooldown of superconductive magnets using a two stage cryocooler and having a two stage interface, said precooler comprising:

a mounting flange for securing the precooler to the two stage interface, said flange having an inlet and outlet port;

a heat exchanger having passageways for carrying a cryogenic fluid;

thermal insulating means for mechanically coupling said heat exchanger and said flange;

a first and second stage heat stations coupled to the heat exchanger to provide heat flow between the first and second stage heat stations and the heat exchanger;

said first and second stage heat stations spaced apart from one another and said flange to contact the heat stations of the two stage interface when inserted therein;

a first thermally insulated pipe connected between one end of said heat exchanger passageway and said inlet port in flow communication; and

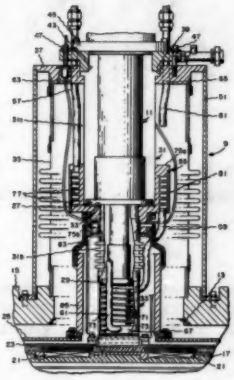
a second thermally insulated pipe connected between the other end of said heat exchanger passageway and said outlet port.

4,926,647

CRYOGENIC PRECOOLER AND CRYOCOOLER COLD HEAD INTERFACE RECEPTACLE

Bizhan Dorri, Clifton Park, and Evangelos T. Laskaris, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 10, 1989, Ser. No. 335,466
Int. Cl.[5] F25B *19/00*
U.S. Cl. 62—51.1 **2 Claims**



1. A superconductive magnet comprising:

a two stage cryocooler having a first and second heat station;

a superconductive magnet winding;

a thermal radiation shield spaced away from and surrounding said winding;

a cryostat defining an aperture spaced away from and surrounding said thermal radiation shield;

a cryocooler cold head interface receptacle situated in said cryostat aperture said interface receptacle providing a first and second heat station for connecting in a heat flow relationship to the cryocooler first and second heat station, respectively, said first and second interface receptacle heat stations thermally insulated from one another; and

a precooler having first and second stage heat exchangers connected in a heat flow relationship with said interface receptacle first and second heat stations, respectively, said interface receptacle having inlet and outlet ports for supplying and removing cryogens, and piping means fabricated from heat insulating material for connecting said first and second heat exchangers in a series flow relationship between said inlet and outlet ports.

4,926,648

TURBOMOLECULAR PUMP AND METHOD OF OPERATING THE SAME

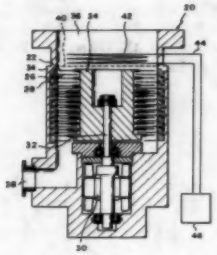
Katsuya Okumura; Fumio Kuriyama; Yukio Mural; Masaba Tsujimura, and Hiroshi Sobukawa, all of Kanagawa, Japan, assignors to Toshiba Corp. and Ebara Corp., both of Tokyo, Japan

Filed Mar. 3, 1989, Ser. No. 318,206
Claims priority, application Japan, Mar. 7, 1988, 63-51623
Int. Cl.[5] B01D *8/00*
U.S. Cl. 62—55.5 **11 Claims**

1. A turbomolecular pump having a rotor provided with a plurality of rotor blades and a spacer provided with a plurality of stator blades so that gas molecules are sucked in from a suction port, compressed and discharged from an exhaust port by the interaction between said rotor and stator blades, wherein the improvement comprises:

a heat exchanger provided inside said suction port, said heat

exchanger being connected to a refrigerator through a refrigerant pipe; and



a gate valve provided on the upstream side of said suction port.

4,926,649

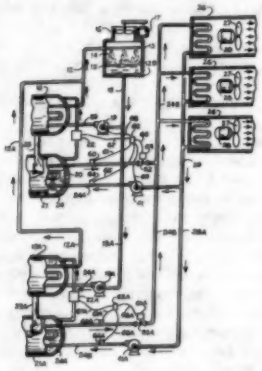
METHOD AND APPARATUS FOR SAVING ENERGY IN AN AIR CONDITIONING SYSTEM

George Martinez, Jr., P.O. Box 1141, Gonzales, La. 70737

Division of Ser. No. 60,535, Jun. 11, 1987, Pat. No. 4,817,395. This application Jul. 11, 1988, Ser. No. 216,964

Int. Cl.[5] F25D *17/02*

U.S. Cl. 62—99 12 Claims



1. A method for reducing the amount of energy consumed in a building utilizing two or more chilled water air conditioning units connected in parallel when less than the entire cooling capacity of all of said units is sufficient to cool the building, each of said air conditioning units containing a supply chilled water line and a return chilled water line, each of said air conditioning units having a compressor, comprising:

a. operating the entire air conditioning system at full capacity until the difference in the temperature of the supply chilled water and the return chilled water is less than a first pre-set temperature,

b. varying the total water flow in one selected air conditioning unit in the return chilled water line and the supply chilled water line of said one selected chiller to maintain the temperature differential between other temperature of the water in the supply chilled water line and the temperature of the water in the return chilled water line at a second pre-set temperature,

c. measuring the temperature of said return chilled water in said one selected air conditioning unit,

d. comparing the temperature of the return chilled water in said one selected air conditioning unit to a third pre-set temperature, and

e. turning off the compressor of said one selected air conditioning unit and the total flow of chilled water thereto when the temperature of said return chilled water is equal to said third pre-set temperature.

4,926,650

REFRIGERANT FLUID AND METHOD OF USE

Douglas D. Dawn, Pasadena, Calif., and Reinhard Radermacher, Kensington, Md., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed May 18, 1988, Ser. No. 195,704

Int. Cl.[5] F25B *13/00*; C09K *5/00*

U.S. Cl. 62—114 4 Claims

1. In a system involving a vapor compression cycle comprising evaporation, compression, condensation and expansion of a refrigerant fluid, the improvement comprising using, as the refrigerant fluid in said system, a fluid comprising a first amount of trichloromonofluoromethane; and a second amount of 1-chloro-1,1-difluoroethane, said second amount comprising between about 12 and 92 mol % based on the combination of the first and second amounts.

4,926,651

CONTROL APPARATUS FOR AUTOMOBILE AIR-CONDITIONERS

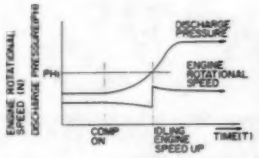
Ichiro Noguchi, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Mar. 30, 1989, Ser. No. 334,881

Claims priority, application Japan, Apr. 13, 1988, 62-49495[U]

Int. Cl.[5] F25B *27/00*; F02M *3/06*

U.S. Cl. 62—133 3 Claims



1. A control apparatus for an automobile air-conditioner, comprising:

(a) a variable displacement compressor driven by an engine and operative to vary its displacement gradually from a small displacement to a large displacement immediately after it is started;

(b) a fast idling device responsive to the start of operation of said variable displacement compressor and operative to increase the idling speed of said engine by a predetermined value;

(c) a pressure sensor for detecting a discharge pressure of said variable displacement compressor; and

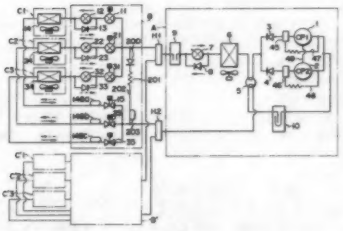
(d) idling-up control means for retarding operation of said fast idling device until detection of a predetermined discharge pressure of said variable displacement compressor by said pressure sensor.

4,926,652

AIR CONDITIONER SYSTEM WITH CONTROL FOR OPTIMUM REFRIGERANT TEMPERATURE

Manabu Kitamoto, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 6, 1989, Ser. No. 306,074
Claims priority, application Japan, Feb. 9, 1988, 63-28105; Feb. 10, 1988, 63-29266
Int. Cl.[5] F25B 7/00
U.S. Cl. 62—175 20 Claims



1. An air conditioner comprising:

an outdoor unit having a variable-capability compressor and an outdoor heat exchanger coupled to said variable-capacity compressor;

a plurality of indoor units, each indoor unit having an indoor heat exchanger and demand-capability data output means for outputting demand-capability data according to an air-conditioning load of its indoor heat exchanger;

a distributing unit for coupling said outdoor unit and said plurality of indoor units in parallel to form respective refrigeration cycles, said distributing unit having a plurality of refrigerant flow control means corresponding to said refrigeration cycles, respectively;

first control means, for supplying to said refrigerant flow control means of said distributing unit refrigerant flow control commands associated with demand-capability data of said plurality of indoor units, and outputting sum data of said demand-capability data;

second control means, for supplying a capacity-change control command to said variable-capability compressor, in accordance with said sum data from said first control means;

refrigerant super-heat detection means for detecting the degree of refrigerant super heat in each indoor unit, said refrigerant super-heat detection means including a plurality of first temperature sensors for detecting temperatures of said refrigerant expelled from said indoor units, and a second temperature in said refrigeration cycle, and calculating differences between said expelled refrigerant temperatures and said pseudo-saturated refrigerant temperature as a pseudo refrigerant super-heat degree in said indoor units; and

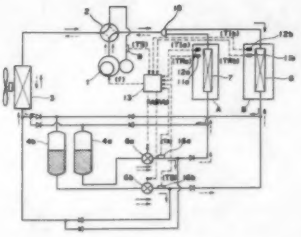
third control means, for supplying refrigerant flow compensation commands associated with a detection output of said refrigerant super-heat detection means, to said respective refrigerant flow control means of said distributing unit.

4,926,653

MULTI-ROOM TYPE AIR-CONDITIONING EQUIPMENT

Masaaki Masuda, Nara; Masanori Kotani, Yamatokooriyama; Katsuhiro Wakahara, Nara, and Shuichi Sakata, Habikino, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 16, 1989, Ser. No. 367,141
Claims priority, application Japan, Jun. 17, 1988, 63-151001; Apr. 10, 1989, 64-91064; Jun. 14, 1989, 64-152618
Int. Cl.[5] F25B 41/04
U.S. Cl. 62—204 5 Claims



1. A two-room type air-conditioning apparatus comprising:

an outdoor apparatus; and

first and second indoor apparatuses respectively connected to said outdoor apparatus through corresponding first and second electric expansion valves respectively, in which refrigerant compressed by a compressor is condensed by respective first and second heat exchangers provided in said first and second indoor apparatuses or by an outdoor heat exchanger provided in said outdoor apparatus after said refrigerant is expanded to be decompressed by said first and second electric expansion valves respectively, said refrigerant is evaporated by said outdoor heat exchanger or said first and second indoor heat exchangers so as to perform an air-conditioning operation such as heating or cooling operations for respective areas,

wherein opening/closing degrees of said electric expansion valves are determined by a ratio of the loads for said first and second indoor apparatuses, the loads being obtained from the differences between setting temperatures set by first and second room temperature setting means provided in said first and second indoor apparatuses respectively and actual room temperatures actually detected by first and second room temperature detecting means provided in the first and second indoor apparatuses respectively.

4,926,654

CONTROL ASSEMBLY FOR ADJUSTING THERMOSTAT SETTING

Ronald M. Johnson, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Sep. 21, 1989, Ser. No. 410,507
Int. Cl.[5] F25B 49/00
U.S. Cl. 62—229 7 Claims

1. A control assembly for a household refrigerator having a mullion partition separating the freezer compartment and the fresh food compartment with a front face and a bottom panel forming the top of the fresh food compartment comprising:

a control bracket mounted on the bottom-panel of the mullion partition, said bracket having a circular aperture with two radial notches;

a thermostat mounted on the control bracket and having a rotatable stem for adjusting the thermostat setting;

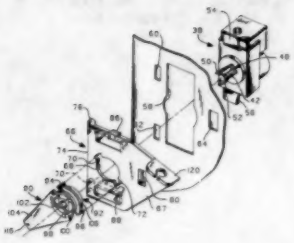
a rotatable hub member having,

a circular central portion with radial lugs slightly smaller than the circular aperture and radial notches of the control bracket with a portion of the central portion and lugs

projected through the circular aperture and radial notches and rotated to mount the hub member on the control bracket,

an aperture in the circular central portion to receive the rotatable stem of the thermostat and dimensioned to rotate the stem in unison with rotation of the hub member,

a lever arm radially outward of the central portion, and



a push-pull device located inside the mullion partition and having one end of the device secured to the lever arm of the hub member and the opposite end of the device is a manual actuator means located at the front of the mullion partition whereby movement of the actuator means rotates the hub member which rotates the thermostat stem to adjust the thermostat setting.

4,926,655

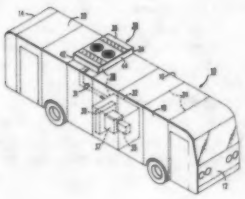
AIR CONDITIONER UNIT SUITABLE FOR MOUNTING ON THE ROOF OF A VEHICLE

Donald D. King, Chanhassen, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.

Filed May 1, 1989, Ser. No. 345,854

Int. Cl.[5] B60H *1/32*

U.S. Cl. 62—244 **11 Claims**



1. An air conditioner unit suitable for mounting on the roof of a vehicle, comprising:

a vehicle having a front, back, first and second sides, a passenger compartment, air delivery ducts for delivering conditioned air to the passenger compartment, conditioned air openings in the roof in communication with said air delivery ducts, and return air openings in the roof in communication with the passenger compartment,

a frame having a bottom, top, first and second ends, first and second sides, and a longitudinal axis extending between said first and second ends,

means fixing said frame to the roof of said vehicle, with the longitudinal axis of the frame oriented front to back on said vehicle,

first and second elongated evaporator coils each having first and second ends and a longitudinal axis which extends between said first and second ends,

said first and second evaporator coils being mounted in spaced relation on said frame, respectively spaced from the first and second sides of said frame, with the longitudinal axes of said first and second evaporator coils being parallel to the longitudinal axis of said frame,

first and second evaporator air delivery means on said frame, respectively between said first side and said first evaporator coil, and between said second side and said second evaporator coil,

openings in the bottom of said frame in registry with the conditioned air and the return air openings in the roof of said vehicle, such that each of the first and second evaporator air delivery means draws return air from the passenger compartment, through the associated evaporator coil, and discharges conditioned air into an air delivery duct of the vehicle,

first and second elongated condenser coils each having first and second ends and a longitudinal axis which extends between the first and second ends,

said first and second condenser coils being mounted in spaced relation on said frame, between and respectively adjacent to said first and second evaporator coils, with the longitudinal axes of said first and second condenser coils being parallel to the longitudinal axis of said frame,

and condenser air delivery means mounted on said frame, between said first and second spaced condenser coils.

4,926,656

INTEGRATED WET BULB DEPRESSION AIR COOLER

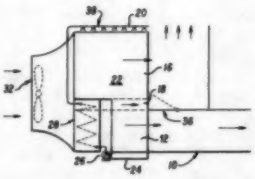
Pieter John A. Hickey, and Cornelius J. Claassen, both of Transvaal Province, South Africa, assignors to Aztec Sensible Cooling, Inc., Albuquerque, N. Mex.

Filed Jun. 30, 1989, Ser. No. 373,489

Claims priority, application South Africa, Jan. 11, 1989, 890209

Int. Cl.[5] F28D *5/00*

U.S. Cl. 62—310 **16 Claims**



1. A method for cooling and supplying air to a space to be cooled comprising steps of;

A. Passing a secondary air stream in direct heat exchange relationship with a recirculating working fluid in a first humidifying and cooling chamber to evaporatively cool said secondary air stream and said working fluid and discharging said secondary air stream from said first humidifying and cooling chamber;

B. Discharging said working fluid from said first humidifying and cooling chamber and passing the working fluid through a primary humidifying and cooling chamber and thereafter collecting said working fluid;

C. Recirculating said working fluid through an indirect heat exchanger to said first humidifying and cooling chamber;

D. Passing a primary air stream in heat exchange relationship with said indirect heat exchanger to thereby indirectly cool said primary air stream and heat said working fluid and thereafter;

E. Passing said primary air stream passing through the indirect heat exchanger through said primary humidifying and cooling chamber in direct heat exchange relationship with said working fluid passing therethrough prior to the working fluid being collected to thereby evaporatively cool said primary air stream and said working fluid, and

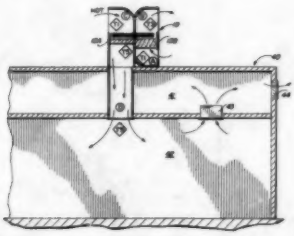
F. Discharging said primary air stream from said primary humidifying and cooling chamber to the space to be cooled.

4,926,657

HEAT PIPE ASSISTED EVAPORATIVE COOLER

Elmer B. Bomar, 3601 E. Pierson, Phoenix, Ariz. 85018

Filed Jun. 30, 1989, Ser. No. 375,203
Int. Cl.[5] F28D 5/00
U.S. Cl. 62—311 11 Claims



1. A heat pipe assisted evaporative cooler comprising:

a heat pipe; and

an evaporative cooler pad coupled to said heat pipe for air flow heat transfer between said heat pipe and said heater pad; and,

means for controlling the direction of air flow through said cooler including:

first means for directing a first volume of air through said cooler pad, to be evaporatively cooled, then further directing said air to impinge on and flow past a first end of said pipe such that said cooled air absorbs heat from said heat pipe; and

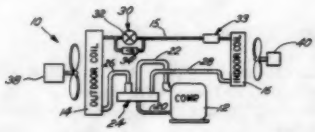
second means for directing a second volume of air to impinge on and flow past a second end of said heat pipe to transfer heat to said heat pipe and to continue to flow through said cooler pad to be evaporatively cooled thereby.

4,926,658

TWO WAY FLOW CONTROL DEVICE

Mark W. Olsen, Carrollton, and John B. Winegardner, Hurst, both of Tex., assignors to Lennox Industries, Inc., Carrollton, Tex.

Filed Apr. 14, 1989, Ser. No. 339,206
Int. Cl.[5] F25B 27/00
U.S. Cl. 62—324.1 7 Claims



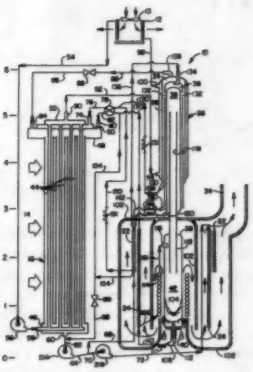
6. In a heat pump comprising a compressor, a reversing valve, an outdoor coil, metering means, and an indoor coil operatively connected to one another, the improvement wherein the metering means includes a two way flow control device comprising a generally cylindrical body means open at each end, a plurality of first axial passages in said body means, a second axial passage in said body, an orifice of predetermined size fixed in position in said second axial passage, an annular washer-like valve member disposed in said body means and movable between a first position blocking said first axial passages to fluid flow while permitting flow through said second axial passage in one direction of fluid flow, and a second position away from said first axial passage to permit fluid flow through said first axial passages to bypass said second axial passage, and orifice means of predetermined diameter fixed in said second axial passage.

4,926,659

DOUBLE EFFECT AIR CONDITIONING SYSTEM

Richard N. Christensen; Anthony C. DeVuono; William H. Wilkinson, and D. Karl Landstrom, all of Columbus, Ohio, assignors to Gas Research Institute, Chicago, Ill.

Filed Mar. 30, 1989, Ser. No. 331,675
Int. Cl.[5] F25B 15/00
U.S. Cl. 62—476 25 Claims



1. In an absorption refrigeration system for conditioning air within a building interior and having an air cooling mode of operation and an air heating mode of operation, in combination:

a. first substantially vertical tube members each having an outer air heat transfer surface and an inner liquid refrigerant/concentrated refrigerant solution heat transfer surface;

b. second substantially vertical tube members cooperating with said first tube members and each having an inner hydronic fluid heat transfer surface and an outer liquid refrigerant/concentrated refrigerant solution heat transfer surface;

c. air distribution means flowing building air substantially horizontally between and around said first tube member outer air heat transfer surfaces in both the system air cooling mode of operation and air heating mode of operation;

d. hydronic fluid loop means cooling and flowing hydronic fluid through said second tube members in heat transfer relation to said second tube member inner surface in the system air cooling mode of operation and heating and flowing hydronic fluid through said second tube members in heat transfer relation to said second tube member inner surfaces in the system air heating mode of operation; and

e. absorption refrigeration fluid distribution means separately and simultaneously flowing liquid refrigerant and concentrated refrigerant solution to said first tube member inner heat transfer surfaces and to said second tube member outer heat transfer surfaces in the system air cooling mode of operation and in the system air heating mode of operation,

said absorption refrigeration fluid distribution means flowing liquid refrigerant to said first tube member inner heat transfer surfaces and flowing concentrated refrigerant solution to said second tube member outer heat transfer surfaces for vertical gravitational flow in the system air cooling mode of operation, and flowing liquid refrigerant to said second tube member outer heat transfer surfaces and flowing concentrated refriger-

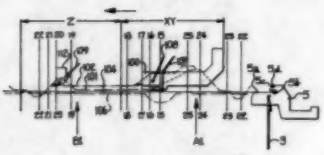
ant solution to said first tube member inner heat transfer surfaces for vertical gravitational flow in the system air heating mode of operation.

4,926,660

METHOD OF KNITTING JACQUARD KNIT FABRIC BY CIRCULAR KNITTING MACHINE

Yamaoko Takashi, Hyogo, Japan, assignor to Precision Fukuhara Works, Ltd., Hyogo, Japan

Filed Oct. 7, 1988, Ser. No. 254,849
Claims priority, application Japan, Mar. 29, 1988, 63-77443
Int. Cl.[5] D04B 9/12
U.S. Cl. 66—9 R 1 Claim



1. A method of knitting a pile jacquard fabric on a circular knitting machine including needles and a single piece sinker positioned between each pair of said needles, and a plurality of groups of two adjacent yarn feeders, said pile jacquard fabric including successive courses of plain jersey stitch wales knit of a ground yarn, each successive course also including a first pile loop yarn knit with the ground yarn in selected groups of adjacent needle wales and forming an individual pile loop in each intervening sinker wale, a second pile loop yarn knit with the ground yarn in other groups of adjacent needle wales and forming an individual pile loop in each intervening sinker wale, multiwale floats on the first pile loop yarn extending above the individual pile loops in the sinker wales of the corresponding selected groups of adjacent needle wales, and multi-wale floats of the second pile loop yarn extending above the individual pile loops in the sinker wales of the corresponding other groups of adjacent needle wales, and wherein the upstanding individual pile loops and the multi-wale floats are adapted to be cut in a shearing operation to form a patterned velour jacquard fabric, said method including the sequential steps of

raising all of the needles to stitch loop clearing level and feeding ground yarn into the hooks at the first yarn feeder of each group while the sinkers are retracted;

lowering first groups of needles to welt level while receiving the ground yarn;

raising second selected groups of needles and feeding the first pile loop yarn in the hooks of said second groups of needles and above inwardly advanced sinkers at the first yarn feeder, while floating the first pile loop yarn inside of said first groups of needles;

raising said first groups of needles from said welt level and feeding the second pile loop yarn in the hooks thereof and above inwardly advanced sinkers at the second yarn feeder, while floating the second pile loop yarn inside of the second groups of needles; and

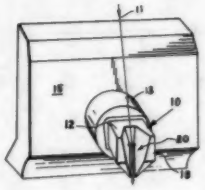
lowering all of the needles to knitting level at the second yarn feeder to form a course of plain jersey stitches of the ground yarn with individual pile loops of the first pile yarn extending upwardly from intervening sinker wales corresponding with the selected groups of adjacent needle wales and with individual pile loops of the second pile yarn extending upwardly from intervening sinker wales corresponding with the other groups of adjacent needle wales, both the individual pile loops of the first and second pile loop yarns being positioned in side-by-side relationship in adjacent groups in one continuous ground yarn course.

4,926,661

YARN FINISH APPLICATOR

Brian M. Agers, Wilmington, Del., and John S. Dickins, III, Wilmington, N.C., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 15, 1989, Ser. No. 323,818
Int. Cl.[5] D06B 1/08
U.S. Cl. 68—200 6 Claims



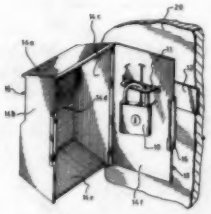
3. A stationary yarn finish applicator surface in which yarn contacts said surface, said surface being provided with a passage through which finish is metered to said surface, said surface having a plurality of depressions evenly distributed over from about 25 percent to about 50 percent of said surface, said depressions forming discontinuous interruptions in said surface in all directions.

4,926,662

PADLOCK SHIELD

Rolland M. Gaudet, Site 26, Box 26, R. R. #1, Windsor Junction, Halifax Co., Nova Scotia, Canada (B0N 2V0)

Filed Jun. 15, 1989, Ser. No. 366,395
Int. Cl.[5] E05B 67/38
U.S. Cl. 70—56 6 Claims



1. A padlock shield for protecting a padlock when it is secured to a staple, said shield comprising:

a cover having a plurality of walls, one of which has a means for receiving a staple therethrough, said means being adapted to receive the staple therethrough at any one of a plurality of orientations.

4,926,663

COMBINATION LOCKS FOR SUITCASES, BAGS AND THE LIKE

Italo Azzalin, Varese, Italy, assignor to C.G.V. S.p.A., Italy

Filed Nov. 30, 1988, Ser. No. 278,192
Claims priority, application Italy, Dec. 10, 1987, 22939 A/87
Int. Cl.[5] E05B 65/48
U.S. Cl. 70—74 15 Claims

1. A combination lock for an article comprising at least two relatively movable parts, particularly a suitcase and the like, comprising:

an engagement member having a striker to be fixed to one of said parts of the article;

a combination mechanism fixed to the other of said parts;

coupling means associated with said combination mechanism and cooperating with said engagement member;

a pair of rotatable discs for setting the combination;

a stop body removably engaged with each respective rotatable disc in such manner as to be rotated with this latter during engagement but to enable the combination to be changed during disengagement;

a sliding grip provided with at least a pair of inclined guide tracks;

at least a pair of sliders each carrying a pin and one of said stop bodies, said pin being slidable along said respective inclined guide track, said sliding, which can occur when the correct combination is set, generating an approach movement of said bodies and causing disengagement between said bodies and the rotatable discs to enable the user to change the lock combination, said grip being formed in such a manner as to generate with its movement the disengagement between said engagement member and said coupling means.

4,926,664

SELF LOCKING ELECTRONIC LOCK

Klaus W. Gartner, 2632 Via Anacapa, Palos Verdes Estates, Calif. 90274, and Alan K. Uyeda, 8317 Elsomore Dr., Rosemead, Calif. 91770

Filed Feb. 16, 1989, Ser. No. 311,696

Int. Cl.[5] E05B 49/00

U.S. Cl. 70—119 **12 Claims**

1. A self locking electronic lock for use with a safe door having manually operated bolt works including a door handle, linkage operated by said handle and door bolts operated by said linkage, said linkage having a lock bolt receiving gate whereby said linkage is immobilized when a lock bolt is received in said gate to thereby lock said safe door, said electronic lock comprising:

a biased lock bolt and mounting means for mounting said lock bolt relative said linkage whereby said bolt is normally biased into said linkage gate when aligned thereto in a linkage locking position and biased against said linkage when not aligned to said gate, in a linkage engaging position whereby manipulation of said linkage by said handle to align said gate to said lock bolt causes said lock bolt to

automatically enter said gate due to its bias toward such linkage locking position.

4,926,665

REMOTELY PROGRAMMABLE KEY AND PROGRAMMING MEANS THEREFOR

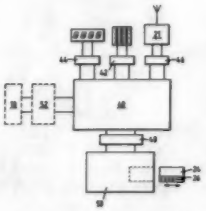
Gerald Stapley, Godalming; Geoffrey Tate, Haslemere, and Derek Hardisty, Brookwood, all of England, assignors to Security Services PLC, London, England

Filed Mar. 11, 1988, Ser. No. 166,983

Claims priority, application United Kingdom, Mar. 12, 1987, 8705892

Int. Cl.[5] E05B 49/00

U.S. Cl. 70—277 **21 Claims**



1. For use with a lock having means to detect a predetermined key code stored on a key and means for responding to said detection to operate the lock, the combination of:

(a) at least one such key for storing data comprising one of a plurality of key codes;

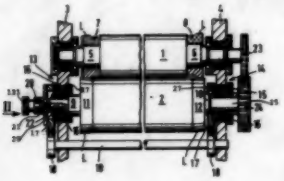
(b) mobile key programming means comprising means for receiving from a remote station a transmitted signal indicating said key code to be stored by the key and for causing the key to store that key code wherein said mobile key programming means is adapted to be taken to a location in the vicinity of the lock, to receive said signal and to cause the key to store the key code at said location; and wherein

(c) each key and storage of said data on each key is such as to require the key code indicated by the transmitted signal to be stored in the key be use of the mobile key programming means.

4,926,666
ASSEMBLY FOR ADJUSTING THE ROLLS OF PUNCHING AND LIKE MACHINES

Georg Götting, Lörrach, and Harro Läuale, Schopfheim, both of Fed. Rep. of Germany, assignors to Grapha-Holding AG, Hergiswil, Switzerland

Filed Jun. 9, 1988, Ser. No. 205,081
Claims priority, application Switzerland, Jun. 19, 1987, 2326/87
Int. Cl.[5] B21B 31/18
U.S. Cl. 72—247 13 Claims



1. In an assembly for treating a running sheet or web, particularly in a punching or a like machine, a combination comprising a first roll; a second roll defining with the first roll a nip for the running web or sheet; and means for selecting the width of the nip, including a plurality of first bearing rings coaxial with said first roll and having conical peripheral surfaces tapering toward the axis of the first roll in a first direction, a plurality of second bearing rings, one for each of said first rings, said second rings being coaxial with said second roll and having conical peripheral surfaces tapering toward the axis of the second roll in a second direction counter to said first direction, the peripheral surfaces of said first rings abutting the peripheral surfaces of the respective second rings, and means for moving at least the first rings and the first roll axially relative to the second rings.

4,926,667
METHOD OF SIZING AND STRAIGHTENING EXTRUDED TUBES

James E. Markiewicz, Roselle, and Darrell G. Shroutz, Elgin, both of Ill., assignors to Precision Extruded Products, Inc., Elgin, Ill.

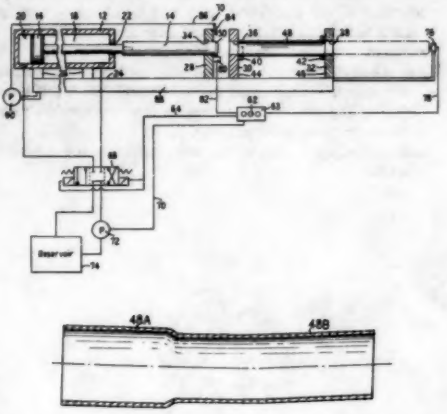
Filed Apr. 17, 1989, Ser. No. 339,317
Int. Cl.[5] B21C 23/00, 45/00; B21D 3/00
U.S. Cl. 72—256 14 Claims

1. A method of sizing and straightening an extruded tube comprising:

extruding a tube of metal having a predetermined internal diameter;

inserting a tapered mandrel having a first portion with an increasing external diameter and a second portion with a relatively large, constant diameter and a length as long as the tube into said tube at a first low insertion speed until the second portion of the mandrel having the large, constant external diameter has entered into that part of the tube pre-expanded by the first portion and then increasing the insertion speed until the mandrel has been fully inserted and the tube fully expanded; and

withdrawing the mandrel from the tube at a first low withdrawal speed until the large, constant diameter second portion of the mandrel has been completely withdrawn from the tube and then increasing the withdrawal speed

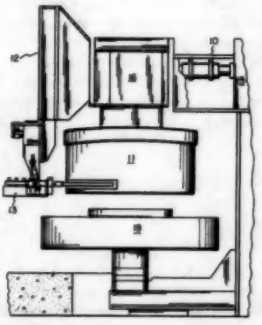


until the entire mandrel is completely withdrawn from the tube.

4,926,668
AUTOMATIC DIE BOX POSITIONING FOR DRAWBLOCK

Robert J. Rau, Pittsburgh, and Donald H. Haydo, Ellwood City, both of Pa., assignors to Italimpianti of America Incorporated, Corsopolis, Pa.

Filed Sep. 18, 1989, Ser. No. 408,671
Int. Cl.[5] B21C 1/02
U.S. Cl. 72—289 5 Claims



1. In a continuous drawblock apparatus for drawing tubing through a reducing die comprising a capstan upon which the tubing is wrapped after passing through the die, said capstan rotating upon an axis and having associated means for gripping and automatically releasing the end of the tubing held at an axial position relative to the capstan known as the start of draw position, said die carried by a die box, means for mounting the die box for translation in the direction of the axis of the capstan, for rotation about a first axis parallel to the axis of the capstan and for rotation about a second axis perpendicular to the first axis, the improvement comprising energizable means for clamping the die box in an infinitely adjustable position about the first axis after the drawing of the tubing has begun and the die box has naturally rotated to the correct drawing position, said clamping taking place in a manner not to jolt the

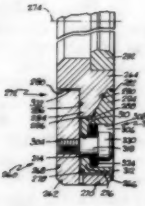
die box, whereby the tubing exits from the die in a direction tangent to the capstan where the tubing first contacts the capstan.

4,926,669

CONTAINER BODY MAKER DIE

Conrad M. Grims; Bruce A. Moen, both of Golden, and Jaroslav F. Pardubicky, Westminster, all of Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Jul. 7, 1989, Ser. No. 376,762
Int. Cl.[5] B21D *22/28*
U.S. Cl. 72—349 **19 Claims**



1. Apparatus for use in positioning a tool member means for contacting a workpiece which is moved through the tool member means by ram means comprising:

an elongated hollow housing having a central opening extending therethrough and a longitudinal axis;

adjustable support means connected to said elongated hollow housing and having portions thereof located within said elongated hollow housing;

at least one workpiece engaging tool member means for performing operations on a workpiece and having a longitudinal axis;

at least one holding means for receiving and supporting said workpiece engaging tool member means and having a longitudinal axis;

said holding means being supported on said adjustable support means so that said holding means and said workpiece engaging tool member means are located within said elongated hollow housing;

clamping means for cooperation with said support means to prevent movement of said holding means in radial directions;

movement permitting means cooperating with said holding means and said workpiece engaging tool member means so that said workpiece engaging tool member means is capable of radial movement in any direction relative to said longitudinal axis thereof when a sufficient radially directed force is applied thereto and for permitting rotational movement of said workpiece engaging tool member means relative to said holding means when a sufficient rotational force is applied thereto;

movable ram means for supporting said workpiece and moving said workpiece through said central opening in said workpiece engaging tool member means, said movable ram means and said workpiece each having a longitudinal axis; and

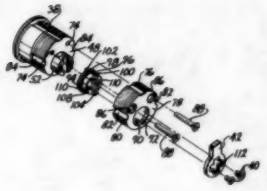
stop means for limiting movement of said workpiece engaging tool member means in directions parallel to said longitudinal axis thereof.

4,926,670

EXTENSION FOR MORTISE CYLINDER

William Deforrest, Sr., Yorba Linda, Calif., assignor to Major Lock Supply Inc., Anaheim, Calif.

Filed Feb. 27, 1989, Ser. No. 316,250
Int. Cl.[5] E05B *9/04*
U.S. Cl. 70—374 **22 Claims**



1. In combination with a mortise cylinder of the type having a cylindrical body, a control element rotatively mounted in the body and a cam member attaching means on the control element for attaching a cam member to the control element, a cylinder extension comprising:

an extension body;

means for fixedly connecting said extension body to said mortise cylinder body;

said extension body including a bore extending through said extension body;

first and second coupling elements sized and shaped to simultaneously be located in said extension body bore and to rotate within said bore;

first coupling means for coupling said first coupling element to said cam member attaching means to couple said first coupling element to said mortise cylinder control element;

a cam member, said cam member including a mounting slot;

second coupling means located on said second coupling element for coupling said cam member to said second coupling element, said second coupling means comprising an attachment tenon located on said second coupling element, said attachment tenon sized and shaped to fit into said cam member mounting slot; and

means for interconnecting said first and second coupling elements whereby when said cylinder extension is mounted on said mortise cylinder, rotation of said control element is transferred through said first coupling element to said second coupling element and to said cam member attached thereto.

4,926,671

PRESS BRAKE

James B. Hill, Rt. 2, P.O. Box 62, Galena, Mo. 65656

Filed Dec. 5, 1988, Ser. No. 279,866
Int. Cl.[5] B21J *9/18*
U.S. Cl. 72—389 **15 Claims**

1. A press brake comprising:

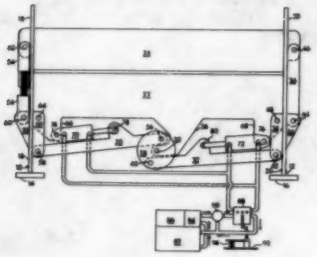
a stationary bar having a first longitudinal end and a second longitudinal end and having a lateral side edge;

a translatable bar having a first longitudinal end and a second longitudinal end and having a lateral side edge facing said stationary bar lateral edge;

means for selectively adjusting the angle of said stationary bar lateral edge relative to said translatable bar lateral edge such that said lateral edges may be selectively oriented at a selected angle, including parallel, with respect to each other and for maintaining said selected angle when said translatable bar is translated toward or away from said stationary bar; and

means for selectively translating said translatable bar toward or away from said stationary bar, said translating means including a disk rotatable about a fixed, stationary axis, a first set of linkage interconnecting one longitudinal end of said translatable bar with said disk, and a second set of

linkage interconnecting the other longitudinal end of said translatable bar with said disk, the rotation of said disk in a first direction acting through both said sets of linkage to



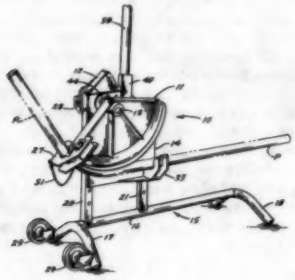
translate said translatable bar toward said stationary bar, and the rotation of said disk in a second direction acting through both said sets of linkage to translate said translatable bar away from said stationary bar.

4,926,672

PIPE BENDER

Melvin E. Swanson, Hayesville, N.C., assignor to Lidseen of North Carolina, Inc., Hayesville, N.C.

Filed May 3, 1989, Ser. No. 346,985
Int. Cl.[5] B21D *7/04*
U.S. Cl. 72—458 **9 Claims**



1. An improved pipe bender for accommodating multiple pipes of varying diameters and bending sections of them into an arcuate form, said pipe bender comprising:

a mounting base;

an axle supported by said mounting base and having opposite end portions which protrude from respective opposite sides of said mounting base;

a pair of sheave blocks, one of which is mounted on each protruding end portion of said axle on each respective opposite side of said mounting base for rotation about the axis of the axle on said opposite sides of said mounting base, each said sheave block including a plurality of arcuate pipe receiving channels adapted for receiving respective pipes therein, the pipe receiving channels on each sheave block being axially offset from one another along its length when positioned in a pipe receiving channel;

first pipe engaging means carried by each of said sheave blocks and cooperating with said pipe receiving channels for engaging and holding pipe at a first location along its length when positioned in a pipe receiving channel;

second pipe engaging means carried by said mounting base on each of said opposite sides thereof and positioned for engaging and holding pipe at a second location longitudinally spaced from said first location;

means for rotating said sheave blocks about the axis of said axle so that a pipe which is positioned in one of said pipe receiving channels is bent into an arcuate form corresponding to that of the respective pipe receiving channel;

and wherein the opposingly mounted sheave blocks cooperate with one another such that the bending moments about the axis of said axle which result from the force required to bend a pipe substantially offset one another to thereby reduce the likelihood of shearing the axle from said mounting base.

4,926,673

PROCESS AND APPARATUS USING AN ELASTOFORMING DIE/FORM BLOCK COMPRISING LOW-HARDNESS SILICONE ELASTOMER

Claude Laurent, Annecy; Paul Rostaing, Vienne, and Rene Lyobard, Saint-Priest, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Division of Ser. No. 13,362, Feb. 11, 1987, Pat. No. 4,824,891. This application Jan. 27, 1989, Ser. No. 302,362
Claims priority, application France, Feb. 11, 1986, 86 01993
Int. Cl.[5] B21D *26/00*
U.S. Cl. 72—465 **3 Claims**

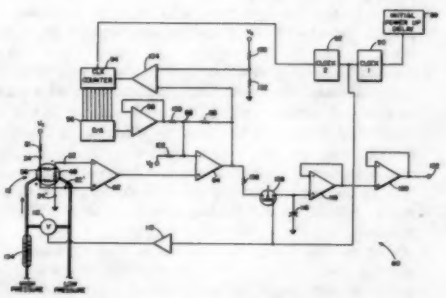
1. In an elastoforming process for the stamping of sheet material workpieces comprising the step of stamping said sheet material workpiece with an elastoforming die or form block, the improvement which comprises utilizing as said elastoforming die or form block therefor, a shaped silicone elastomer comprising a crosslinked fluid organopolysiloxane including at least one silicone-compatible organic or inorganic plasticizer within the crosslinked network thereof, said at least one plasticizer being stable and nonmigrating under elastoforming stamping conditions, and said at least one plasticizer being present in such amount that said plasticized silicone elastomer has a Shore 00 hardness of less than about 40.

4,926,674

SELF-ZEROING PRESSURE SIGNAL GENERATOR

Steven C. Fossum, Hopkins; J. Gregory Sedivy, Prior Lake, and Wayne K. Savick, Eden Prairie, all of Minn., assignors to Innovex Inc., Hopkins, Minn.

Filed Nov. 3, 1988, Ser. No. 266,819
Int. Cl.[5] G01L *27/00*
U.S. Cl. 73—4 R **11 Claims**



1. A method of generating a zeroed pressure signal comprising the steps of:

generating an electrical signal which varies as fluid pressure difference varies between two domains;

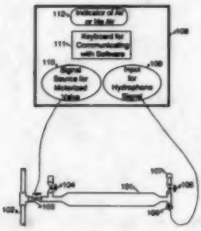
applying the electrical signal to the noninverting input of an operational amplifier;
applying a feedback signal from the output of the operational amplifier to the inverting input of the operational amplifier;
periodically eliminating the pressure difference between the two areas;
determining a compensation signal to be summed with the feedback signal at the inverting input of the operational amplifier to adjust the output signal of the operational amplifier to the value of a reference signal; and
thereafter summing the determined compensation and feedback signals at the inverting terminal while pressure differences are allowed to occur between the domains.

4,926,675

AIR DETECTOR FOR LIQUID-FILLED SENSING LINES

Gerald A. Schohl, Knoxville, and Svein Vigander, Norris, both of Tenn., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Division of Ser. No. 169,917, Mar. 18, 1988, Pat. No. 4,858,460. This application Mar. 17, 1989, Ser. No. 325,277
Int. Cl.[5] G01N *33/00*
U.S. Cl. 73—19 **22 Claims**



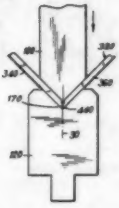
1. An active comparative standing wave frequency system eminently suitable for measuring and comparing the characteristics of a fluid static in or flowing through containment means, said containment means including first conduit means, and said measuring of characteristics including detecting inhomogeneities comprising air pockets, gas bubbles, or both in said fluid within said first conduit means, said system comprising:
(a) void detection attachment means, said void detection attachment means comprising:
(1) second conduit means for containing a relatively small portion of fluid, said second conduit means operatively associated with said first conduit means;
(2) pressure transient inducing means operatively associated with said second conduit means;
(3) pressure response detecting means operatively associated with said second conduit means; and
(b) pressure response analyzer means coupled to receive the output from said pressure response detecting means, said pressure response analyzer means comprising:
(1) power spectrum indicative means for providing, over a predetermined frequency range, the distribution of the pressure fluctuations sensed by said pressure response detecting means, said pressure fluctuations effected in said second conduit means by virtue of same being induced therein by said pressure transient inducing means;
(2) storage means for the resulting distribution of said pressure fluctuations;
(3) retrieval means operatively associated with said storage means and with later mentioned standing wave frequency comparator means; and
(4) standing wave frequency comparator means for effecting a comparison between the frequency distribution of said pressure fluctuations with previously stored frequency distributions, said previously stored frequency distributions subsequently retrieved from said storage means by said retrieval means, and said standing wave frequency comparator means thereby operable to detect a change in the quantitative value of inhomogeneities in said fluid within said first conduit means.

4,926,676

FORMING PROCESS FOR PRODUCING SHARP CORNERS IN SHEET METAL

Lowell Bailey, Long Beach, and Hervey Libbert, Redondo Beach, both of Calif., assignors to Lane & Roderick, Inc., Santa Fe Springs, Calif.

Continuation of Ser. No. 93,409, Sep. 4, 1987, abandoned. This application Mar. 30, 1989, Ser. No. 332,416
Int. Cl.[5] B21D *9/08*
U.S. Cl. 72—389 **1 Claim**



1. A process for producing a sharp corner in a sheet metal workpiece along a transverse plane thereof, which comprises:
(a) placing the workpiece between a pair of forming dies,
the first, female die being in the form of a first pair of generally orthogonally directed intersecting planar surfaces,
the second, male die being in the form of a second pair of generally orthogonally directed intersecting planar surfaces having a nipple machined on the intersection of said second pair of surfaces and extending lengthwise thereof,
the intersections of said surfaces being aligned with one another and with the transverse plane in the workpiece,
and said nipple having a first dimension extending a substantial distance in the direction of the female die and a second dimension extending lengthwise of said dies defining a volume sufficient to displace the workpiece into substantially all of the region of the female die adjacent the intersection of said first pair of intersecting planar surfaces;
(b) forcing the workpiece into contact with said forming dies to bend it, in a single operation, along said transverse plane, the nipple imposing an additional forming force on the sheet metal to penetrate into at least about ⅓ of its thickness and displace a substantial amount of the sheet metal into said region and thereby form the sharp corner in the workpiece.

4,926,677

DIE APPARATUS

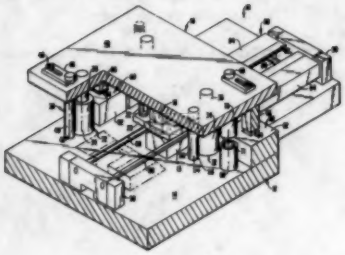
Kurt Waldner, 12260 Saraglen Dr., Saratoga, Calif. 95170

Filed Dec. 3, 1987, Ser. No. 128,291
Int. Cl.[5] B21J *15/24*
U.S. Cl. 72—430 **19 Claims**

3. Die apparatus comprising:
a pair of vertically spaced die plates, the lower plate adapted to mount a lower die and the upper plate adapted to mount an upper die aligned with the lower die, whereby the dies will perform at least one function on a work piece between the dies when the die plates move relative to and toward each other;

means coupled with the die plates for lifting the upper die plate away from the lower die plate, said lifting means permitting the upper die plate to be lowered until the upper die is in proximity to a work piece when the work piece is substantially supported on the lower die;

a pair of stop members on the die plates, one of said members having a resilient element engageable by the other stop member to deaden the sound when said power means is actuated; and



a solenoid assembly including a coil having a central opening and an armature receivable within the opening, said assembly being coupled with the die plates for applying a downward force on the upper die plate when the upper die is in proximity to the work piece so that the upper die is moved further downwardly in processing relationship to the work piece, whereby the power stroke of said power device is relatively short to thereby minimize the noise associated with the power stroke.

4,926,678

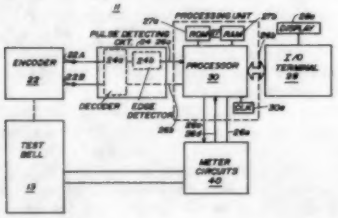
METHOD AND APPARATUS FOR PROVING ELECTRONIC GAS METERS AT LOW FLOW RATES

Arthur N. J. Pearman, St. Paul, Minn., assignor to Gas Research Institute, Chicago, Ill.

Filed Oct. 11, 1988, Ser. No. 255,644

Int. Cl.[5] G01F *25/00*

U.S. Cl. 73—3 **11 Claims**



1. A method for proof testing of an electronic fluid flow meter and the like at low flow rates, comprising:

supplying test fluid to the meter under test;

measuring the actual volume flow rate of test fluid supplied to the meter using a volume measurement standard apparatus and a timing means associated with the volume measurement standard apparatus for measuring the interval of time taken for the test fluid to pass through the meter;

enabling the meter to measure the volume flow rate of test fluid supplied to the meter during the time interval measured by said timing means and to provide data indicative of measured volume flow rate during said time interval;

and correlating the measured volume flow rate for the fluid passed through the meter with the actual volume flow rate in proving the operation of the meter.

4,926,679

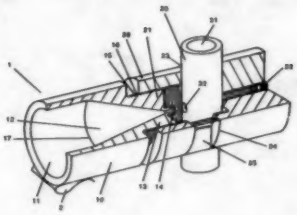
INERTIAL IMPACTION AIR SAMPLING DEVICE

Katharine H. Dewhurst, 13150 Wenonah SE. Apt. 727, Albuquerque, N. Mex. 87123

Filed Dec. 10, 1987, Ser. No. 130,926

Int. Cl.[5] G01N *31/00*

U.S. Cl. 73—28 **21 Claims**



1. A portable inertial impact sampler of solid aerosol particulates in gas, comprising:

a. cylindrical means for collimating a flow of gas, said means having an input end for receiving the gas and an output end for expelling the gas, said output end being shaped to provide a parallel flow of gas in a first direction;

b. tubular flow diverting means for diverting said parallel gas flow to a second direction normal to said first direction;

c. a sample collecting surface within said flow diverting means; and

d. mounting means, capable of being connected to said cylindrical means, for selectively

(1) adjustably spacing said surface to receive said parallel flow from said output end, said surface extending parallel to said second direction, whereby the size of particulates collected on said surface is controlled by the size of said output end, the rate of flow of said gas, and the spacing between said output end and said surface; and

(2) releasing said surface from said output end for measurement and analysis of particulates collected on said surface, said mounting means comprising

a central axis,

opposed first and second ends, said first end capable of being removably attached to said cylindrical means,

a transverse cylindrical bore located at said second end of, and extending through said mounting means perpendicular to said central axis, whereby said tubular flow diverting means is capable of being removably inserted and rigidly fixed into said bore for collection of solid aerosol particulates in a gas, and

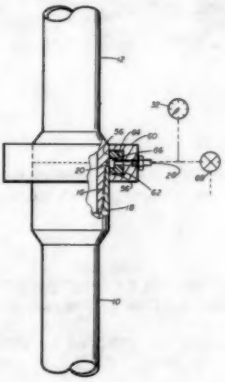
a window aperture located in a wall of said mounting means opposite, but aligned with, said bore, whereby said tubular flow diverting means, when inserted into said bore, may be viewed for alignment with said output end of said cylindrical means.

4,926,680

METHOD AND APPARATUS FOR EXTERNALLY AND INTERNALLY TESTING FOR LEAKS IN CONNECTIONS BETWEEN TUBULAR MEMBERS

Brian B. Hasha, 6114 Willowcrest Ct., Spring, Tex. 77389; Malvern M. Hasha, 14655 Champion Forest Dr., #1802, Houston, Tex. 77069, and Bruce B. Hasha, 19103 Owen Oak, Humble, Tex. 77346

Filed Feb. 9, 1988, Ser. No. 154,981
Int. Cl.[5] G01M 3/28
U.S. Cl. 73—46 13 Claims



1. A method for externally hydrostatically testing an integral connection between two sections of pipe, each of said sections of pipe bearing threads on at least one of its ends, said pipe sections being joined together by threadedly engaging one of said pipe sections with the other of said pipe sections wherein an interference seal is provided between selected mating surfaces carried on corresponding male and female ends of said joined sections of pipe, and wherein an external radial orifice is defined between said joined sections of pipe which radial orifice is in fluid communication with a space defined between said threads borne on said male and female ends of said joined pipe sections, said method comprising:

supplying a leak testing apparatus having an annular housing including an annular seal which seal defines an annular chamber, and having a conduit formed in said annular housing and in said annular seal, to allow fluid communications between an exterior portion of said housing and said annular chamber,

placing said leak testing apparatus circumferentially about said connection with said annular housing surrounding and contacting an outer annular surface portion of said connection in a selected localized area, and with said annular chamber placed in fluid communication with said external radial orifice;

providing means for determining a possible leak in said connection and operatively connecting said means for determining to said conduits,

supplying a pressurized hydrostatic test fluid to said leak testing apparatus by moving said fluid from said exterior portion of said housing, through said conduit, through said annular chamber, and into said space between said threads;

selectively applying said pressurized hydrostatic test fluid principally in the vicinity of said external radial orifice without applying substantial test pressure radially to said outer annular surface portion of said connection in the vicinity of said interference between said mating surfaces on said corresponding male and female ends of said sections of pipe, which radially applied test pressures would tend to substantially affect said interference seal's bearing pressure; and

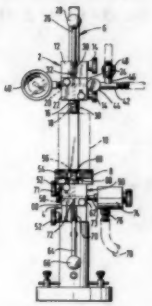
determining if said connection leaks through appropriate use of said means for determining.

4,926,681

CONTAINER CONTENT TESTER

Nicholas B. Fitzpatrick, Haslemere, England, assignor to The BOC Group plc, Windlesham, England

Filed Sep. 8, 1988, Ser. No. 242,017
Claims priority, application United Kingdom, Sep. 9, 1987, 8721175
Int. Cl.[5] G01D 21/02; G01N 7/00, 27/28
U.S. Cl. 73—52 12 Claims



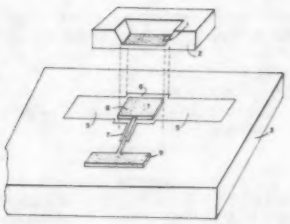
1. Apparatus for testing the contents of a sealed container holding a liquid under the pressure of gas in a head space, including a first piercer positioned and operable to penetrate a top of the container whereby to place the headspace of the container in communication with at least one gas passageway, and a second piercer positioned and operable to penetrate a bottom of the container whereby to place the liquid in communication with a liquid passageway.

4,926,682

VISCOSITY SENSOR

James W. Holm-Kennedy, and Scot P. McArthur, both of Honolulu, Hi., assignors to The Research Corporation of the University of Hawaii, Honolulu, Hi.

Filed Jun. 3, 1988, Ser. No. 201,887
Int. Cl.[5] G01N 11/00
U.S. Cl. 73—54 27 Claims



11. Viscosity sensor apparatus comprising a transducer, electrical driving means connected to the transducer, a substrate connected to the transducer, the substrate having a recess means which is at least partially closed by the transducer, thereby forming a gap, conduit means connected to the recess means for conducting fluid to and from the gap and impeding means connected to the conduit means for impeding

passage of the fluid in the conduit means, wherein when the transducer is energized by the driving means and volume of the gap is changed, and sensor means connected to the transducer for sensing time dependent response and for indicating viscosity of fluid in the gap.

4,926,683

METHOD OF TESTING A SET OF WHEEL SPEED SENSORS FORMING PARTS OF AN ANTI-LOCK BRAKE CONTROL SYSTEM

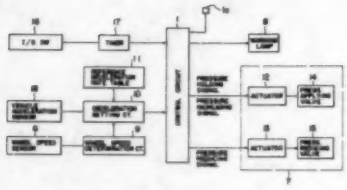
Seiichi Ishizeki, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 304,184, Jan. 31, 1989. This application Sep. 14, 1989, Ser. No. 407,137

Claims priority, application Japan, Feb. 3, 1988, 63-23527

Int. Cl.[5] G01M *19/00*

U.S. Cl. 73—118.1 5 Claims



1. A method of testing an anti-lock brake control system for a motor vehicle having a set of wheels, a wheel brake for each wheel, and a hydraulic unit to produce fluid pressure according to a predetermined sequence provided by the anti-lock brake control system, the anti-lock brake control system including a plurality of wheel speed sensors for detecting the rotational speed of each wheel and providing a wheel speed signal indicative thereof, a control circuit for controlling the fluid pressure, a terminal for receiving a check signal, and a warning device for indicating a malfunction of the anti-lock brake control system, the method of comprising the steps of:

connecting the terminal and the warning device to the control circuit;

applying a check signal received by the terminal to the control circuit;

determining whether the check signal is applied to the control circuit within a first predetermined time period;

maintaining the warning device in a check mode;

successively rotating each of the wheels at a predetermined brake control speed and detecting wheel speed signals from the wheel speed sensors within a second predetermined time period;

storing trouble data indicating that a speed sensor has failed to provide a wheel speed signal within the second predetermined time,

retrieving any stored trouble data;

displaying the trouble data;

terminating the check mode of the warning device; and

erasing the trouble data.

4,926,684

APPARATUS FOR DISSIPATING SHOCK-WAVE ENERGY EXPERIENCED BY A TEST MODEL

Moshe Zilberman, Maccabim; Mordechai Livne, Ramat Hasharon; Doron Tchetchick, Tel Aviv, and Moshe Daniel, Metar, all of Israel, assignors to Israel Aircraft Industries, Ltd., Israel

Filed May 19, 1989, Ser. No. 354,160

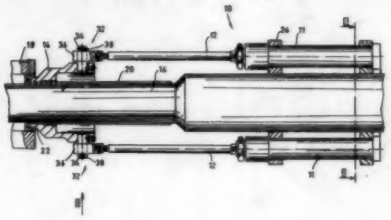
Claims priority, application Israel, May 23, 1988, 86471

Int. Cl.[5] G01M *9/00*

U.S. Cl. 73—147 7 Claims

1. Apparatus for dissipating shock-wave energy experienced by a test model having a base and being supported at a first location by a sting in a wind tunnel comprising:

tapered means movably mounted onto the sting for locking thereto at a second location the base portion of the test model and



means for selectably moving said means for locking into and out of locking engagement with the test model and the sting.

4,926,685

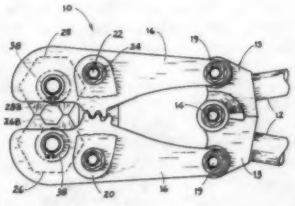
ADJUSTABLE CRIMPING TOOL

John K. Shannon, Sr., 2000 S. Vincennes Cir., Racine, Wis. 53402

Filed Sep. 19, 1989, Ser. No. 409,100

Int. Cl.[5] B21D *7/06*

U.S. Cl. 72—410 20 Claims



1. In an adjustable crimping tool of the type having at least one jaw, a die wheel rotatably mounted thereon to selectively expose die portions with different profiles for accepting workpieces of different shapes and/or sizes, and means to secure the die wheel in selected position, the improvement comprising:

the jaw and die wheel each having a non-round aperture therethrough, said apertures being in coaxial alignment;

an axle extending through the non-round apertures with axially aligned first and second portions selectively engageable with the non-round apertures, the jaw and die wheel non-rotatable on the first portion and rotatable on the second portion, said first and second portions being axially movable with respect to both said apertures.

4,926,686

METHOD FOR DETERMINING THE WEAR OF THE CUTTING MEANS OF A TOOL DURING DRILLING A ROCKY FORMATION

Hubert Fay, L'Etang La Ville, France, assignor to Institut Francais du Petrole, Rueil Malmaison, France

Filed Sep. 19, 1988, Ser. No. 246,192

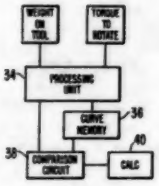
Claims priority, application France, Sep. 17, 1987, 8712928

Int. Cl.[5] E21B *44/00*

U.S. Cl. 73—151 8 Claims

7. A device for determining wear of the cutting means of a tool during drilling a formation, comprising instruments at the

well bottom for measuring the weight W on the tool and the torque T required to rotate said tool, means for applying a weight on the tool during a test period, wherein device comprises means for transmitting the weight and torque measurements to a processing unit which converts said measurements into a curve representative of the torque variations according



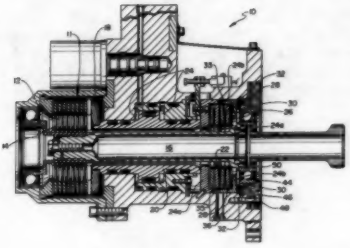
to the variations of the weight, means for memorizing said representative curve for a given test period, means for comparing different representative curves corresponding to successive test periods, and means for calculating the degree of wear on the basis of the variation of a valve corresponding to said representative curves.

4,926,687

SYSTEM AND METHOD FOR OBTAINING A GIVEN PRELOAD ON A SPRING

Eli Avny, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 3, 1988, Ser. No. 266,646
Int. Cl.[5] G01L *1/04*
U.S. Cl. 73—161 **16 Claims**



1. In a device which requires a given preload on a spring or other resilient member, a system for obtaining the given preload comprising:

means for setting the spring under the influence of a given load;

receptacle means for containing the spring and including at least one member positionally movable relative to a fixed member in response to said spring setting;

first shim means for placing between the receptacle means and the spring for first adjusting the spring setting outside the device while the spring is under the influence of said given load whereby a position of the movable member is set responsive to the adjusting;

second shim means for placing between the receptacle means and a portion of the device for readjusting the spring setting inside the device; and

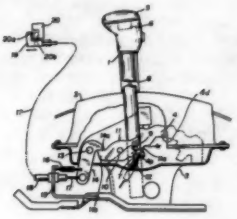
access means in the device to afford observation from outside the device of the position of the movable member inside the device to compare the readjusting with the first adjusting.

4,926,688

PARKING LOCK FOR AUTOMOTIVE VEHICLES

Isao Muraoki, Okazaki, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1989, Ser. No. 301,518
Claims priority, application Japan, Feb. 26, 1988, 63-23835[U]
Int. Cl.[5] G05G *5/06*
U.S. Cl. 74—527 **3 Claims**



1. A parking lock for use in an automotive vehicle having an automatic transmission gear system with a rotatable output shaft and having a key cylinder adapted to receive an ignition key, said lock comprising:

a selector lever adapted to be shifted into any one of a plurality of positions, including a parking position, said output shaft being locked against rotation when the lever is in parking position;

a horizontally projecting detent pin secured to said lever and vertically movable from a first position when the lever is in any position other than the parking position to a second position when the lever is in the parking position;

a detent plate which is engaged by the pin when the pin is in the second position and is disengaged from the plate when the pin is in the first position;

a first cam rotatably pivoted to said detent plate and formed with a first abutting portion and an engaging portion, said engaging portion being engaged by said detent pin when the selector lever is set in said parking position;

a second cam rotatably pivoted to said detent plate and formed with a second abutting portion adapted to abut said first abutting portion of said first cam;

a connection member having first and second ends, the first end of the member connected to the key cylinder, the second end of the member being connected to an end of the second cam; and

biasing means for biasing the first and second cams toward each other so as to bring the second abutting portion into positive abutment with said first abutting portion, whereby removal of the key from the key cylinder is permitted only when the selector lever is shifted to said parking position and the detent pin is in engagement with the detent plate.

4,926,689

PROOFMASS SUSPENSION ASSEMBLY FOR ACCELEROMETERS

Richard A. Hanson, 21220 NE. 156th Ave., Woodinville, Wash. 98072

Continuation of Ser. No. 899,975, Aug. 25, 1986, abandoned.
This application Oct. 12, 1988, Ser. No. 257,189
Int. Cl.[5] G01P *15/08*
U.S. Cl. 73—497 **20 Claims**

1. An improved pendulous type of proofmass suspension assembly for an accelerometer having a support structure, a sensitive axis, a proofmass, and sensing means including components thereof carried by said proofmass for detecting a response in said proofmass to an acceleration along said sensitive axis for indicating an acceleration of said accelerometer

along said sensitive axis, wherein said proofmass suspension assembly comprises:

a frame which is mounted to said support structure;

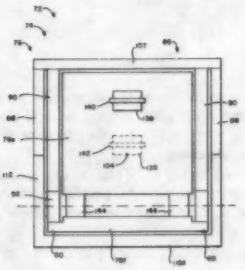
an isolation bridge;

one or more isolation bridge flexures; and

one or more proofmass flexures;

wherein said proofmass flexures and said isolation bridge flexures are thinner than both said isolation bridge and said proofmass in a direction parallel to said sensitive axis when the proofmass is at rest, whereby to support said proofmass for pivotal movement relative to said isolation bridge;

wherein said one or more proofmass flexures connect said bridge to one side of said proofmass such that the proofmass is supported in a pendulous manner for limited back and forth movement about an axis adjacent one side of the proofmass and through a resting plane which contains the proofmass when the latter is in its resting position;



wherein said isolation bridge is pendulously connected to said frame by said one or more isolation bridge flexures for pendulous movement toward and away from said resting plane;

wherein said one or more proofmass flexures are spaced from and are not directly connected in any substantial way with said one or more isolation bridge flexures; and

wherein said isolation bridge is supported by said isolation bridge flexures and said proofmass flexures in a sufficiently compliant manner to absorb random strains in order to substantially prevent random strains in said frame and said one or more isolation bridge flexures from reaching said one or more proofmass flexures and said proofmass and thereby possibly produce substantial errors in the output of said sensing means and indicate inaccurately an acceleration of said accelerometer.

4,926,690

PENDULOUS ACCELEROMETER AND/OR INCLINOMETER

Paul E. Oberg, 3231 Forest Crest Dr., Minneapolis, Minn. 55431

Filed Mar. 7, 1988, Ser. No. 164,558

Int. Cl.[5] G01P *33/401*

U.S. Cl. 73—514 **23 Claims**

1. A pendulous accelerometer indicating by deflection of an indicator element in an XZ plane a pendulous acceleration undergone by a mass accelerating in a YZ plane that is orthogonal to the XZ plane, the accelerometer comprising:

an X axis shaft, parallel to or coincident with an X coordinate axis;

a first pendulous mass, affixed to the X axis shaft, moving in an arc due to an accelerating force in the YZ plane so as to induce rotation of the X axis shaft;

a first member, affixed to the X axis shaft, defining at an extension from the X axis shaft and between two elements of the first member that are aligned approximately about radial lines from the X axis shaft a region that is capable of laterally interlocking a second member, the first member undergoing movement in the YZ plane corresponding to arcuate movement of the first pendulous mass;

a Y axis shaft, parallel to or coincident with a Y coordinate axis;

an angled helical second member in three dimensions and not in any one plane, affixed at two separated points to the Y axis shaft for an axis of rotation, and extending radially away from the Y axis shaft at these points until, a predetermined distance of separation having been reached, the second member runs along the length of the Y axis shaft at a pitch;

the X axis shaft being located in an plane that is normal to the Y axis shaft and that intersects the Y axis shaft in the region of the second member;

the second member laterally interlocked by the two elements of the first member's extended region so that movement of the first member and the two elements of its extended region responsive to X axis shaft rotation causes a corresponding rotation of the second member and of the Y axis shaft.

4,926,691

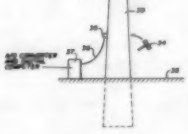
APPARATUS AND METHOD FOR TESTING WOODEN POLES

Douglas E. Franklin, Abbotsford; Maurice W. Murphy, and Richard A. Palylyk, both of Surrey, all of Canada, assignors to Powertech Labs, Inc., Surrey, Canada

Continuation-in-part of Ser. No. 838,538, Mar. 11, 1986, abandoned. This application Jan. 10, 1989, Ser. No. 295,478

Int. Cl.[5] G01N *29/04*

U.S. Cl. 73—579 **9 Claims**



1. A method of determining the stiffness and condition of a wooden pole in the ground comprising:

(a) initiating the natural vibration of the wooden pole in frequency band that covers at least two of the first five natural modes of vibration;

(b) generating an electrical response equivalent to the vibration motion of the wooden pole;

(c) converting the electrical response to a digital signal;

(d) calculating at least two of the first five natural frequencies of the wooden pole from the digital signal;

(e) formulating a mathematical model of the wooden pole in the ground, comprising a linearly tapered structural element connected to a spring, the linearly tapered structural

element representing the portion of the pole above the ground, and the spring representing the portion of the pole below the ground;

(f) adjusting the magnitude of linear taper and spring constant in the mathematical model until the natural frequencies of the mathematical model are substantially the same as the natural frequencies of the wooden pole;

(g) calculating the stiffness of the mathematical model for the linear taper and spring constant thus obtained, this stiffness being equivalent to the stiffness of the wooden pole;

(h) changing the spring constant in the mathematical model to a very large value and recalculating the stiffness of the mathematical model; a and

(i) calculating the ratio between these two stiffnesses, called relative stiffness, which is a measure of the condition of the wooden pole near the ground line.

4,926,692

METHOD OF MEASUREMENT OF RESIDUAL STRESSES IN THE MATERIAL OF THE OBJECT UNDER TEST

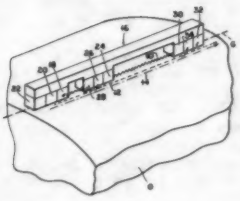
Andrzej Brokowski; Julian Deputat, and Krzysztof Mizerski, all of Warsaw, Poland, assignors to Polska Akademia Nauk Instytut Podstrowowych Problemow, Warsaw, Poland

Continuation of Ser. No. 35,064, Apr. 6, 1987, abandoned. This application Nov. 4, 1988, Ser. No. 268,662

Claims priority, application Poland, Apr. 18, 1986, 259038

Int. Cl.[5] G01N *29/00*

U.S. Cl. 73—597 **5 Claims**



1. A method of measuring residual stresses in the material of an object, comprising:

propagating surface and longitudinal and transverse subsurface ultrasonic waves in the material of an object in the same direction along one line parallel to a surface of the object;

detecting the travel times of the waves over a path length along the line of the object and a path of the same length in a standard of the same grade of material as the object;

determining experimentally the elastoacoustic constants and constants of proportionality for the material of the object; and

calculating residual stress components parallel and perpendicular to the direction of propagation of the waves from the travel times and constants.

4,926,693

CONTACTLESS ACTUATOR PISTON PROXIMITY SENSOR

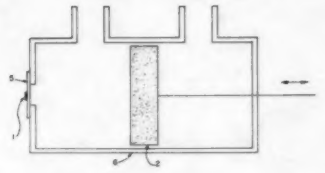
James W. Holm-Kennedy; Eric H. Kawamoto, and Thomas T. Bopp, all of Honolulu, Hi., assignors to The Research Corporation of the University of Hawaii, Honolulu, Hi.

Filed Jun. 3, 1988, Ser. No. 201,940

Int. Cl.[5] G01S *15/32*

U.S. Cl. 73—597 **6 Claims**

1. A hydraulic actuator piston proximity sensor comprising: a chamber, an acoustic transducer, acoustical coupling means for acoustically coupling the transducer to the chamber, electrical driving means for driving the transducer whereby the transducer transmits ultrasonic energy through the said acoustically coupling means into the chamber, and monitoring means for monitoring electric characteristics of the transducer for determining piston position, wherein the transducer is a piezoelectric crystal and said driving means include means for



driving the transducer by a modulated frequency over a frequency range near the piezoelectric crystal's resonant frequency and wherein the monitoring means comprises means for determining the absolute proximity of the piston by measuring change in frequency between extreme in electrical impedance of the piezoelectric crystal by the monitoring means.

4,926,694

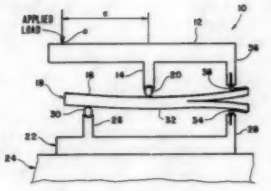
DELAMINATION TEST APPARATUS AND METHOD

John H. Crews, Jr., Grafton, and James R. Reeder, Hampton, both of Va., assignors to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 28, 1989, Ser. No. 386,172

Int. Cl.[5] G01N *3/00*

U.S. Cl. 73—794 **12 Claims**



1. An apparatus for testing a laminated composite specimen having upper and lower opposite surfaces and first and second ends, said second end being delaminated forming oppositely disposed lower and upper arms on said second end comprising:

a base having two opposite ends;

a first support extending upwardly from the base and movably supporting said first end of the specimen;

a second support extending upwardly from the base and being spaced from the first support and fixedly connected to the lower arm of said second end of the specimen;

a load applying beam having first and second ends and a fulcrum for abutment with the upper surface of the specimen at a point between the first and second supports;

a third support extending from said second end of said beam and being fixedly connected to the upper arm of the specimen at said second end of the specimen, the second and third supports being substantially aligned; and

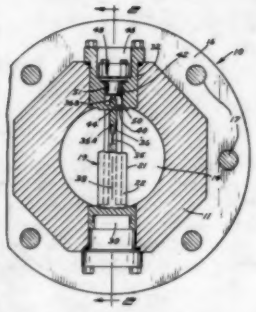
means for applying a load to the beam at a point between the fulcrum and the first end of the beam thereby simultaneously generating opening and shear stresses in the specimen to increase the delamination at said second end.

4,926,695

ROCKING BEAM VORTEX SENSOR

Lowell A. Kleven, Eden Prairie, and Gary P. Corpron, Chanhassen, both of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.

Filed Sep. 15, 1987, Ser. No. 96,954
Int. Cl.[5] G01F 1/32
U.S. Cl. 73—861.24 **27 Claims**



1. An apparatus providing an output indicative of a flow of fluid, comprising:

a housing which includes a body for inducing vortices in the fluid as a function of the flow, the housing having an isolation chamber therein;

a thin sensing diaphragm formed in the body and being supported at peripheral portions on the body and open to the fluid for deflecting laterally responsive to the vortices formed by the body;

a beam coupled to the sensing diaphragm to move laterally therewith and extending to an isolated beam surface positioned in the isolation chamber for transferring deflection of the sensing diaphragm to the isolated beam surface, the sensing diaphragm extending both upstream and downstream from the beam;

sensing means coupled to the isolated beam surface for sensing deflection thereof and for providing the output indicative of the flow; and

an isolator diaphragm formed in the housing and sealingly joined to the beam for isolating the isolation chamber from the fluid such that the sensing means are not in contact with the fluid.

4,926,696

OPTICAL MICROPRESSURE TRANSDUCER

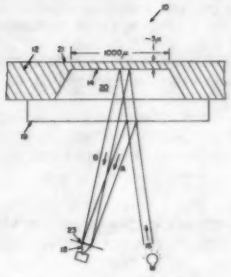
Joseph H. Haritonidis, Cambridge; Stephen D. Senturia, Boston; David J. Warkentin, Cambridge, all of Mass., and Mehran Mehregany, Merriam, Kans., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Nov. 19, 1986, Ser. No. 932,780
Int. Cl.[5] G01D 5/34; G01L 7/08, 9/00
U.S. Cl. 73—205 **32 Claims**

1. A diaphragm transducer involving Michelson-type interferometry comprising:

a diaphragm micromachined into a substrate, the diaphragm being responsive to pressure;

an optical surface connected to the substrate with a defined gap between the diaphragm and the optical surface, wherein one of the diaphragm and the surface is a transparent member and the other is a reflective member, where said transparent member serves as a fixed local reference plane by splitting a coherent source light beam into a locally reflected beam part and a transmitted beam part, the locally reflected beam part being immediately reflected from and the transmitted beam part being transmitted through a common surface of the transparent member such that the transmitted beam part of the split source beam is reflected off said reflective member and transmitted back through the transparent member, and the locally reflected beam part of the split source beam is reflected locally off the transparent member in a direction away from the reflective member to interfere with said transmitted beam part transmitted back through the transparent member after being reflected off the reflective member, the interference being indicative of the amount of deflection of the diaphragm due to a pressure applied across the diaphragm; and



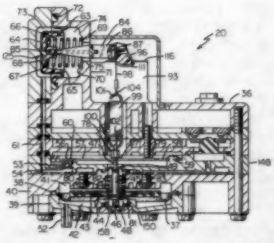
light detector means for detecting the interfering light and producing an indication of the amount of deflection.

4,926,697

DIFFERENTIAL PRESSURE TRANSMITTER, A SQUARE ROOT EXTRACTING DEVICE THEREFOR AND METHODS OF MAKING THE SAME

George T. Hardin, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 13, 1989, Ser. No. 297,665
Int. Cl.[5] G01F 1/46
U.S. Cl. 73—861.48 **6 Claims**



1. In a differential pressure transmitter comprising means for producing an output pneumatic signal from a pneumatic source in relation to the air velocity pressure of air flowing in a passage, means for sensing the difference between the total pressure and the static pressure of said air flowing in said passage, and means for extracting the square root of said air velocity pressure of said air from said pneumatic output signal as said pneumatic output signal is being produced so that said pneumatic output signal is substantially linear with respect to said air velocity of said air flow in said passage whereby said transmitter comprises a linear air velocity transmitter, said means for extracting the square root comprising a cam having a cam face that defines at least part of the involute of a circle, a roller having a surface that defines a substantially circular transverse

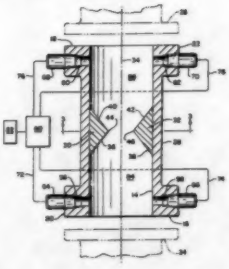
cross-sectional configuration, said roller carrying said cam so that said cam rotates as said roller rolls on said surface thereof, a flat surface engaged by said surface of said roller so that said roller can roll on said flat surface, a movable wall carried by said transmitter and defining an output signal chamber therewith whereby the position of said wall is determined by the value of the pressure in said output signal chamber, rod means operatively interconnecting said wall to said roller to roll said roller on said flat surface as the value of said pressure in said output chamber changes, and a cable, said means for producing said output pneumatic signal comprising a bleed nozzle carried by said transmitter and a flapper lever pivotally carried by said transmitter for controlling said bleed nozzle, said means for sensing the difference between the total pressure and the static pressure comprising a housing having a pair of chambers separated from each other by a flexible diaphragm whereby one of said chambers is for receiving said total pressure therein and the other of said chambers is for receiving said static pressure therein, said flexible diaphragm having a post that is operatively interconnected to said flapper lever to transmit movement of said diaphragm to said flapper lever which will produce said output pneumatic signal with said nozzle, said cam face of said cam being operatively interconnected to said flapper lever by said cable, said cable having opposed ends one of which is operatively interconnected to said flapper lever and the other of which is secured to said cam face in such a manner that said cable is wound onto said cam face as said roller rolls on said flat surface in one direction and is unwound from said cam face as said roller rolls on said flat surface in the opposite direction to said one direction, the improvement wherein said rod means and said movable wall respectively have universal joint means snap-fitted together to provide for universal movement therebetween while movement of said wall causes said roller to roll on said flat surface, said transmitter having first stop means, said rod means having abutment means engaging said stop means when the value of said output signal is below a start point value thereof, said transmitter having a second stop means and an actuator spring operatively interconnected to said movable wall to move said movable wall against said second stop means when said transmitter is in a relaxed state thereof, said universal joint means having lost motion means therein to permit said wall to move against said second stop means after said abutment means of said rod means has engaged its respective stop means.

4,926,698

DUAL WEDGE FLOW ELEMENT

Raymond E. Owen, Rochester, N.Y., assignor to Process Automation Business, Inc., Columbus, Ohio

Filed Mar. 3, 1989, Ser. No. 318,696
Int. Cl.[5] G01F *1/42*
U.S. Cl. 73—861.61 **12 Claims**



1. A liquid flow metering device comprising:

a body having a cylindrical wall defining a flow bore passing through first and second ends thereof;

means for connecting the first and second ends of the body to first and second cylindrical liquid impulse lines, respectively;

two substantially solid wedge members located in the bore symmetrically about the bore axis, each wedge member having a first surface oriented obliquely to the bore axis and generally facing the first end of the body, and a second surface oriented obliquely to the bore axis and generally facing the second end of the body, the first and second surfaces of each wedge member forming an apex edge that is spaced from and oriented substantially perpendicularly to the bore axis, each of the wedges having a peripheral surface opposite the apex edge, which conforms to and is selectively detachable from the wall;

first sensor means, for sensing the fluid pressure at a first location within the bore between one of said first surfaces and the first end of the body; second sensor means, for sensing the fluid pressure at a second location within the bore between one of said second surfaces and the second end of the body;

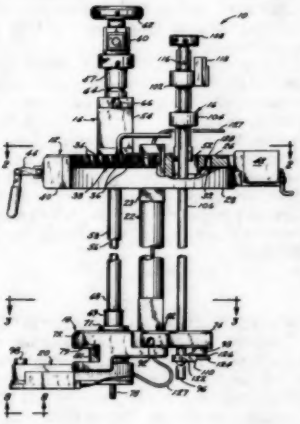
whereby the fluid flow rate through the bore can be determined from the sensed pressures at the first and second locations.

4,926,699

TORQUE TOOL

Luigi C. Salce, Sr., Quinebaug, Conn., assignor to Advance Manufacturing Co., Inc., Westfield, Mass.

Filed Apr. 3, 1989, Ser. No. 332,877
Int. Cl.[5] B25B *23/14*; B23P *19/06*
U.S. Cl. 73—862.21 **12 Claims**



1. A device for torquing and untorquing visible or hidden nuts on bolts disposed on a common circle of centers on an inner disk hub in the rotor assembly of a jet engine, said device comprising

(a) a bolt locating platform disposed outside of said rotor assembly,

(b) a trunnion assembly rotatably disposed within said rotor assembly,

(c) a connector connecting said bolt locating platform to said trunnion assembly in a predetermined relationship,

(d) a torquing assembly disposed on said platform and extending into said rotor assembly wherein it passes through said trunnion assembly to a point beyond same,

(e) a torque box disposed beneath said trunnion assembly, said torque box having one end thereof connected to said torquing assembly,

(i) a nut socket disposed on the upper side of said torque box at the other end thereof, said nut socket being operably connected by gear means to said torquing assembly,

(f) a nut inserter assembly for transferring a nut from a point outside of said rotor assembly to a point within said rotor assembly wherein said nut is deposited in the nut socket of said torque box, and

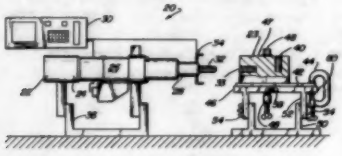
(g) means for monitoring and measuring bolt torquing and untorquing parameters.

4,926,700

BLIND HOLE THREAD GAUGE

Alphonso Peplinski, 35534 Mound Rd., Sterling Heights, Mich. 48310

Filed Mar. 27, 1989, Ser. No. 329,270
Int. Cl.[5] G01L 5/24
U.S. Cl. 73—862.23 10 Claims



1. An apparatus for testing a threaded hole formed within a part, comprising:

a motor;

a driven rotary element driven by said motor;

a torque gauge and transducer monitoring the torque between said motor and said driven rotary element;

means for monitoring the torque readings from said torque gauge and transducer;

a threaded plug element mounted within said driven rotary element and dimensioned so as to approximate predetermined desired dimensions of a given threaded hole that is to be tested; and

control means that compare the monitored torque read-outs with predetermined minimum and maximum torque readings and identify whether a given threaded hole to be tested has been properly formed, a torque read-out that is less than the predetermined minimum or greater than the predetermined maximum identifying an improper threaded hole.

4,926,701

PIPETTING METHOD AND APPARATUS

David J. Tompkins, Ashford, England, assignor to Kontron Instruments Holdings, NV., Curacao, Netherlands

Continuation of Ser. No. 80,138, Jul. 31, 1987, abandoned. This application Mar. 9, 1989, Ser. No. 323,249
Claims priority, application Switzerland, Aug. 14, 1986, 3263/86
Int. Cl.[5] G01N 1/14
U.S. Cl. 73—864.15 5 Claims

1. A pipetting apparatus for accurately pipetting a predetermined quantity of a liquid, comprising:

a. probe means for receiving and dispensing the predetermined quantity of a liquid;

b. a fluid line connected to the probe means;

c. pump means connected to the fluid line for drawing air and the predetermined quantity of liquid into the probe means during an intake phase and expelling the air and predetermined quantity of liquid from the probe means during a delivery phase;

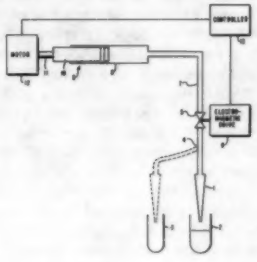
d. flow control means interposed in said fluid line between the probe means and pump means for permitting the air and predetermined quantity of liquid to flow therethrough when said flow control means is in an open state and hindering flow of the air and predetermined quantity of liquid therethrough when said flow control means is in a closed state; and

e. controller means connected to said pump means and flow control means for controlling the intake phase and delivery phase of said pump means and the open state and closed state of said flow control means, such that

(i) the flow control means is in the open state during the intake phase of the pump means, whereby the air and predetermined quantity of liquid may be drawn into the probe means during the intake phase;

(ii) the flow control means is in the closed state for a portion of the delivery phase of the pump means to hinder flow of the air and predetermined quantity of liquid there through thereby compressing the air and retaining a portion of the predetermined quantity of liquid; and

(iii) the flow control means is returned to the open state during the delivery phase of the pump after compression of the air to thereby cause the pipetting apparatus to rapidly expel the compressed air through the probe means creating an air stream which entrains the retained portion of the predetermined quantity of liquid not previously expelled, thereby accurately pipetting the predetermined quantity of liquid.

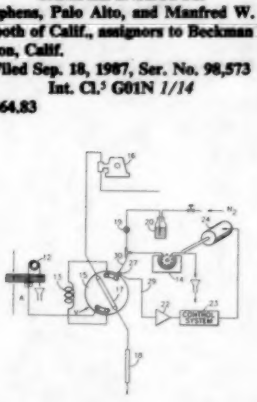


4,926,702

SAMPLE PRESENCE DETECTOR FOR AUTOMATIC SAMPLE INJECTOR

Donald E. Stephens, Palo Alto, and Manfred W. Unterbusch, Sunnyvale, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Sep. 18, 1987, Ser. No. 98,573
Int. Cl.[5] G01N 1/14
U.S. Cl. 73—864.83 20 Claims



1. In a chromatographic circuit including a sample injector valve for use in injecting sequential samples into an analyzer

system wherein said system includes: a sample source including a sample within a conductive fluid; a fluid source having a substantially nonconductive fluid; an analyzer column; the injector valve including a stationary housing and a moving valve member, said valve including conductive material at a first electrical potential; said stationary housing having a plurality of ports, said ports being in fluid communication respectively with said sample source, said fluid source and said analyzer column; said movable valve member mounted to said housing and defining a sample trapping passageway, said movable valve member movable from a first position wherein said sample trapping passageway is in fluid communication with said sample source to a second position wherein said sample trapping passageway is in fluid communication with said analyzer column; one of said ports of said housing constituting a registered port communicated to said sample passageway when said movable valve member is in said first position; a pump for pumping said sample through said sample trapping passageway towards said registered port; and means for stopping said pump responsive to said movement of said sample, the improvement in said means for stopping said pump comprising: a conductive member electrically isolated from said valve penetrating said registered port immediately adjacent said sample passageway, said conductive member at a second electrical potential; circuit detector means electrically communicated to said conductor member for detecting the presence of said sample upon entrance to said registered port; whereby sample upon first entrance to said registered port immediately stops said pump.

4,926,703

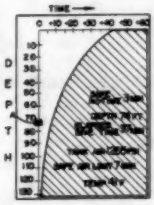
METHOD AND APPARATUS FOR DETERMINATION AND DISPLAY OF CRITICAL GAS SUPPLY INFORMATION

William D. Budinger, 16 Southridge Dr., Kennett Square, Pa. 19348

Division of Ser. No. 169,651, Mar. 21, 1988, Pat. No. 4,876,903, which is a continuation-in-part of Ser. No. 142,370, Jan. 11, 1988, abandoned. This application Feb. 9, 1989, Ser. No. 308,509

Int. Cl.[5] G06F *15/42*

U.S. Cl. 73—865.1 3 Claims



1. A portable diving apparatus with a means for displaying to a diver critical safety information relating to depths and times, the information being displayed in a two dimensional Pictorial format and in a manner that provides the diver with a visual reference for his condition at the current depth in comparison with potential conditions at other times and depths where the diver may operate safely.

4,926,704

VALVE TEST PLUG

Robert J. Sarvil, Duncanville, and Robert T. Weber, Dallas, both of Tex., assignors to Flow Design, Inc., Dallas, Tex.

Filed Apr. 10, 1989, Ser. No. 335,891

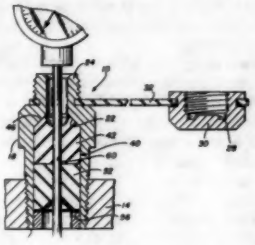
Int. Cl.[5] G01L *7/00*

U.S. Cl. 73—866.5 4 Claims

1. An improved valve test plug for use with a slender, elongated test probe comprising:

a hollow valve body having a first end arranged for connection to a pressure vessel with the interior of the body exposed to the fluid pressure in the vessel and having a second end remote from said vessel, said body having an interior shoulder adjacent to said second end and a tapered interior surface on said shoulder;

a resilient valve core located in the interior of said body, a first end on said engageable with said shoulder in said body, said core having a second end and a slit sized to receive the test probe extending through first and second



ends of said core, the first end of said core being exposed to fluid pressure in said vessel to force the second end of said core into engagement with said tapered interior surface whereby said core is biased toward a smaller diameter forcing said slit closed; and

said resilient valve core also includes a first core portion including the first end of said core, and a second core portion including the second end of said core, said second core portion located in tandem relationship to said first core portion and being harder than said first core portion.

4,926,705

STARTER DEVICE FOR INTERNAL COMBUSTION ENGINES

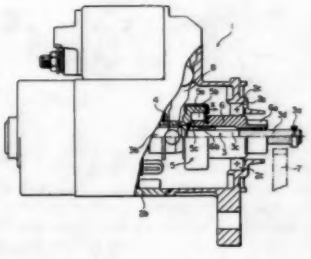
Akira Morishita; Toshinori Tanaka, and Shunzo Isozumi, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,643

Claims priority, application Japan, Oct. 7, 1987, 62-153526[U]; Nov. 6, 1987, 62-170612[U]

Int. Cl.[5] F02N *11/00*

U.S. Cl. 74—6 10 Claims



1. A starter device for an internal combustion engine, comprising:

a housing;

an output shaft rotatably supported by said housing;

drive means for driving said output shaft in one rotational direction;

a hollow shaft member disposed coaxially around said out-

put shaft, said hollow shaft member being splined to said output shaft so as to slidable in the axial direction of said output shaft;

a hollow cylindrical member disposed coaxially around said output shaft at a front side of said hollow shaft member, said hollow cylindrical member having a portion, opposite the side near the hollow shaft member, at which the inner diameter thereof is reduced;

a pinion formed at the front end of said hollow cylindrical member at which the inner diameter thereof is reduced, said pinion being placed into driving engagement with a ring gear of said internal combustion engine when said hollow cylindrical member is slid to a front position on said output shaft;

bearing means coupled to an inner circumferential surface of said hollow cylindrical member for rotatably supporting said hollow cylindrical member around said output shaft, said bearing means allowing said hollow cylindrical member to slide in the axial direction of the output shaft;

one-way clutch means for sliding said hollow shaft member to said hollow cylindrical member for transmitting a rotational force in one rotational direction;

sliding means for sliding said hollow cylindrical member, together with said hollow shaft member, in the axial direction on said output shaft between a rear and a front axial limit position; and

a rust-preventive coating provided on an outer circumferential surface of said output shaft along an axial length which is situated axially in front of said bearing means when said hollow cylindrical member is slid to said front axial limit position, said axial length provided with said rust-preventive coating including at least a portion of said output shaft which projects out of said hollow cylindrical member when said hollow cylindrical member is at said rear axial limit position whereby sliding contact between said output shaft and said hollow cylindrical member is facilitated.

4,926,706

COAXIAL ENGINE STARTER

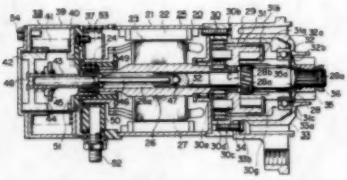
Shuzoo Isozumi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1989, Ser. No. 318,561

Claims priority, application Japan, Mar. 3, 1988, 63-51021

Int. Cl.[5] F02N *11/00*; F16H *57/02*

U.S. Cl. 74—7 A **2 Claims**



1. A coaxial engine starter comprising

an electric motor having a tubular armature rotary shaft;

an output rotary shaft disposed at a front end of said electric motor and having at a first end a pinion and axially slidably inserted into an inner bore of said armature rotary shaft at a second end;

planetary speed reduction gear including a sun gear formed around an outer periphery of a front end of said armature rotary shaft and a plurality of planetary gears meshing with said sun gear for reducing the rotational speed of said armature rotary shaft;

an over-running clutch including a clutch inner member fitted on said output rotary shaft for transmitting the rotation of said armature rotary shaft transmitted through said planetary speed reduction gear to said output rotary shaft;

a front bracket including an inner front bracket connected to said electric motor and containing therein at least said overrunning clutch and said planetary speed reduction gear and an outer front bracket connected to said inner front bracket;

a ball bearing having an inner and an outer race for rotatably supporting said output rotary shaft, said inner race of said bearing being held in its position by said clutch inner member and said pinion, and said outer race of said bearing being held in its position by said inner front bracket and said outer front bracket.

4,926,707

ACTUATOR FOR AUTOMOTIVE DOOR LOCKING DEVICE

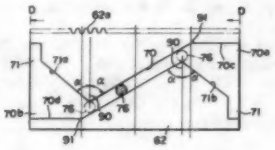
Shinjiro Yamada, Utsunomiya, Japan, assignor to Mitsui Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 252,921

Claims priority, application Japan, May 1, 1986, 61-101807

Int. Cl.[5] F16H *25/18*; E05C *3/26*

U.S. Cl. 74—96 **3 Claims**



1. An actuator for an automotive door locking device comprising:

a rotating member **62** that is rotatable by a power source M;

a cam groove formed in the rotating member **62**;

a cam follower **76** that moves along the cam groove; and

a lock lever **31** which moves between a lock position and a unlock position as a result of the movement of the cam follower **76**;

the cam groove having a first groove **70** for moving the lock lever **31** between the lock position and the unlock position and a second groove **71** for moving the cam follower **76** between the ends **70***a*, **70***b* of the first groove **70** without using the first groove **70**,

the first groove **70** having on one of its side walls at least a first inclined wall **71***c*, for moving the cam follower **76** from one end **70***a* of the first groove **70** to the other end **70***b* and a second inclined wall **71***a*, which is inclined reverse to the first inclined wall **71***c*;

the first groove **70** having on the other side wall at least a third inclined wall **71***d*, for moving the cam follower **76** from the second end **70***b* to the first end **70***a* of the first groove **70** and a fourth inclined wall **71***b*, which is inclined reverse to the third inclined wall **71***d*;

whereby the first through fourth inclined walls **71***a*, **71***b*, **71***c*, **71***d* of the first groove **70** are cut in such a way that the pressure angles between the cam follower **76** and the first through fourth inclined walls **71***a*, **71***b*, **71***c*, **71***d* are almost constant.

4,926,708

APPARATUS FOR CONVERTING ROTARY MOTION INTO AXIAL MOTION

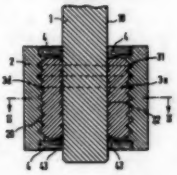
Johannes Dietrich, Gilching, and Bernd Gombert, Furstenfeldbruck, both of Fed. Rep. of Germany, assignors to Deutsch Forschungsanstalt fur Luft- und Raumfahrt e.V., Linder Hohe, Fed. Rep. of Germany

Filed Nov. 8, 1988, Ser. No. 268,892

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3739059

Int. Cl.[5] F16H *25/22*

U.S. Cl. 74—424.8 C 3 Claims



1. Apparatus for converting rotary motion into axial motion, having a threaded spindle, an internally contoured nut surrounding the threaded spindle and capable of rotating relative to said spindle, and having a number of interposed contour rollers, wherein the threaded spindle (1) has a simplex or multiplex fine thread (10) on an outside surface thereof, the interior contour of the nut (2) that can rotate relative to the spindle comprises relatively coarse grooves (20), the rollers (3*a* to 3*f*) have two differing contours (31; 32) on alternating sections whereby one contour (31) fits the fine thread (10) on the spindle (1) and another groove contour (32) corresponds to the relatively coarse grooves (20) in the interior of the nut (2), wherein the one contour (31) produces the axial connection with the fine thread (10) on the spindle (1), and the other contour (32) produces the axial connection with the coarse groove contour (20) on the interior of the nut (2).

4,926,709

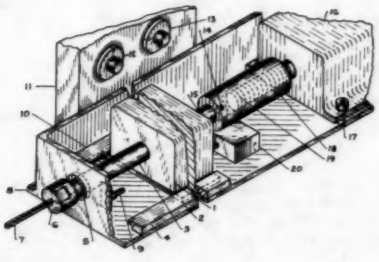
MOTION TRANSMITTING SYSTEMS FOR MACHINERY & MACHINE TOOLS

James J. Gardner, 700 East Fifth Ave., Lancaster, Ohio 43130

Filed May 16, 1988, Ser. No. 194,507

Int. Cl.[5] F16H *1/10*

U.S. Cl. 74—424.88 13 Claims



1. A motion transmitting system comprising:

an elongated spindle connected at its forward end to a tool carrier means;

said spindle being connected at its rear end to a front output means of a first rotary power means, which rotates said spindle about its longitudinal axis;

said first rotary power means having a rear output means, which is generally opposite of said front output means;

an elongated first connector is connected to said rear output means of said first rotary power means, which rotates said first connector about its longitudinal axis;

said first connector having at least one helical groove with corresponding ridges spiralling longitudinally thereof;

an elongated second connector having at least one helical groove with corresponding ridges spiralling longitudinally thereof, which are engaged with said first connector's helical grooves and ridges;

said first and second connector's helical grooves fitting slidably into one another's helical ridges such that dissimilar angular velocities between said first and second connector create longitudinal linear motion therebetween;

said second connector being connected to a second rotary power means which rotates said second connector about its longitudinal axis;

means anchoring said second rotary power means in a functionally engaging relationship with the system;

means restraining said second connector from linear movement while simultaneously permitting angular velocity thereof about its longitudinal axis;

supporting means;

said spindle, said first rotary power means, and said first connector move linearly in unison when first and second connectors rotate at said dissimilar angular velocities;

bearing means including between said first rotary power means and at least one supporting surface;

said first rotary power means being retained in alignment against a supporting means by at least one retaining means, which permits linear movement in a predetermined direction relative to the longitudinal axis of said spindle;

enclosing means;

shock-absorbing means;

stopping means controlling linear movement;

angular velocity control means;

angular velocity brake means;

said first rotary power means being prearranged to rotate a predetermined amount faster than said second rotary power means;

said first and second rotary power means rotating in the same direction;

a sequence of operations as follows: first, activation of said first rotary power means resulting in rapid advancement of said spindle to a first predetermined position; second, activation of said second rotary power means resulting in feed advancement of said spindle to a second predetermined position; third, deactivation of said first rotary power means resulting in rapid retraction of said spindle to a third predetermined position; fourth, deactivation of said second rotary power means, thus completing a cycle; and control means for said sequence of operations.

4,926,710

METHOD OF BALANCING BLADE GAS TURBINE ENGINE ROTOR

Rudolph J. Novotny, Stuart, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 94,213, Sep. 8, 1987, Pat. No. 4,848,182.

This application Feb. 13, 1989, Ser. No. 310,177

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.[5] F16F *15/32;* B21K *3/04*

U.S. Cl. 74—573 R 4 Claims

1. A method of balancing a bladed gas turbine engine rotor having a plurality of bladed disks comprising:

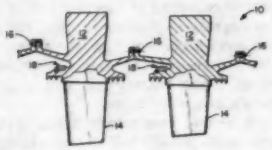
shrink fitting within each disk a balance ring;

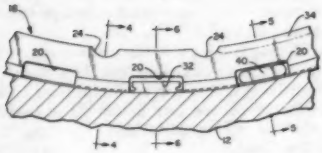
spinning each disk together with the balance ring individually to determine the unbalance of the disk together with the balance ring;

correcting the unbalance of the disk together with the bal-

ance ring by removal of material only from the balance ring;

assembling a plurality of bladed disks to form a rotor;





spinning the rotor to determine the unbalance of the rotor; and

correcting the unbalance of the rotor by adding weights at selected locations within the balance ring.

4,926,711

WORM GEAR TYPE DIFFERENTIAL MECHANISM

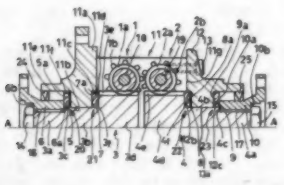
Yoshichika Arakawa, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Nov. 21, 1988, Ser. No. 273,609

Claims priority, application Japan, Nov. 21, 1987, 62-293099

Int. Cl.[5] F16H *1/44*

U.S. Cl. 475—227 **5 Claims**



1. A worm gear type differential mechanism comprising:

a casing,

first and second shafts having axially aligned first and second ends rotationally disposed in said casing,

a first worm gear joined for common rotation with said first end of said first shaft, said first end facing said second end of said second shaft,

a second worm gear joined for common rotation with said second end of said second shaft,

a first worm wheel supported rotationally to said casing orthogonally to said first and second shafts, and engaged with said first worm gear,

a second worm wheel supported rotationally to said casing orthogonally to said first and second shafts and extending parallel to said first worm wheel, said second worm wheel engaging said second worm gear,

spur gears joined for common rotation with said first and second worm wheels, respectively, and engaged with one another, and

bias ratio equalizing means disposed between said casing and said first and second worm gears operating in response to the occurrence of relative rotation between said first and second shafts for equalizing the ratios of torque acting on said worm gears such that the ratio of the torque T_1 acting on the worm gear of the faster shaft to the torque T_2 acting on the worm gear of the slower shaft is substantially equal regardless of which of said shafts constitutes the faster shaft, said first worm gear includes first and second axially spaced transverse faces, said casing including third and fourth axially spaced transverse faces, said first and third transverse faces being axially opposed to define a first space, said second and fourth transverse faces being axially opposed to define a second space, said second worm gear including fifth and sixth axially spaced transverse faces, said casing including seventh and eighth axially spaced transverse faces, said fifth and seventh transverse faces being axially opposed to define a third space, and said sixth and eighth transverse faces being axially opposed to define a fourth space, said bias ratio equalizing means comprising friction members disposed in said first, second, third and fourth spaces.

4,926,712

WORM WHEEL AND METHOD OF HOBBING SAME

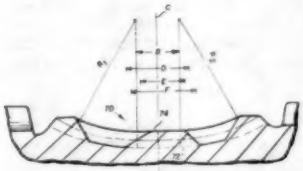
Gene A. Stritzel, Rochester, N.Y., assignor to DK-Gleason, Inc., Rochester, N.Y.

PCT No. PCT/US86/02161, § 371 Date Oct. 15, 1986, § 102(e) Date Oct. 15, 1986, PCT Pub. No. WO88/02829, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 15, 1986, Ser. No. 363,910

Int. Cl.[5] F16H *00/00*

U.S. Cl. 475—227 **33 Claims**



1. An hourglass worm wheel having a longitudinal axis, a generally hourglass-shaped root surface and at least one gear tooth formed thereon, said root surface increasing in diameter from opposite ends of a mid zone which is substantially cylindrical and which cylindrical mid zone extends over a predetermined axial distance.

4,926,713

MULTIPLE GEAR-RATIO AUTOMATIC TRANSMISSION

E. Gaylord Madill, Edmonton, Canada, assignor to H.V.T. Technology Ltd., Edmonton, Canada

Filed Mar. 15, 1989, Ser. No. 323,979

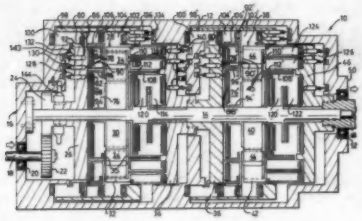
Int. Cl.[5] F16H *37/00, 3/44, 57/10*

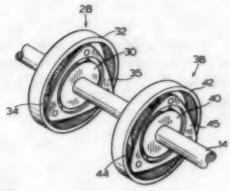
U.S. Cl. 475—146 **6 Claims**

3. The transmission of claim 1, wherein means for selectively transmitting power from said power input means comprises:

first power transfer plate means rotatably mounted on said stationary shaft adjacent to and operatively connected to said power input means, selectively-operable hydraulic clutch means connecting said first power transfer plate means and said sun gear, ring gear and planet carrier of

said first planetary gearset, and selectively-operable hydraulic clutch means for connecting said sun gear to said





stationary shaft and said ring gear and said planet carrier to a reaction sleeve.

4,926,714

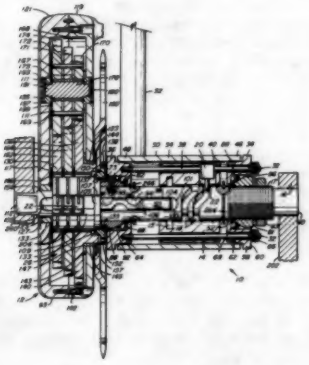
GEAR SELECTOR FOR BICYCLE HUB TRANSMISSION

Louis Bailey, Donniz Dr., Rte. 5, Box 60A, Slidell, La. 70460, assignor to Louis Bailey, Slidell, La.

Filed Sep. 21, 1988, Ser. No. 247,790

Int. Cl.[5] F16H *3/66*

U.S. Cl. 74—337.5 **31 Claims**



1. A reverse pedal-actuated, multi-speed bicycle transmission comprising:

a pedal shaft rotatably displaceable in a pedal shaft hub of a bicycle frame;

said pedal shaft hub having opposed open ends;

a plurality of drive gears rotatably disposed on said pedal shaft for selective rotational engagement therewith;

pawl means for selectively connecting each of said drive gears into driving engagement with said shaft;

a cam follower disposed about said pedal shaft for longitudinal displacement therealong;

cam follower support means supporting said cam follower to prevent rotation thereof;

cam follower engagement means engageable with said cam follower and said pedal shaft and responsive to an arc of reverse rotational displacement of said pedal shaft for displacing said cam follower longitudinally with respect to said pedal shaft; and

a pawl arm disposed on said pedal shaft for rotation therewith and longitudinal displacement thereon in response to cam follower displacement for effecting the selective connection of each of said drive gears into rotational engagement with said pedal shaft.

4,926,715

PLANETARY GEAR TRAIN

Manfred Hirt, and Heinrich Arndt, both of Augsbury, Fed. Rep. of Germany, assignors to Zahnraderfabrik Renk AG, Fed. Rep. of Germany

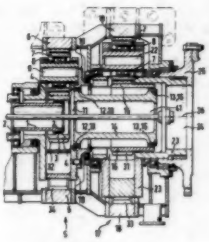
PCT No. PCT/EP83/00034, § 371 Date Jul. 29, 1983, § 102(e) Date Jul. 29, 1983, PCT Pub. No. WO83/02810, PCT Pub. Date Aug. 18, 1983

PCT Filed Feb. 14, 1983, Ser. No. 519,763

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1982, 3205208

Int. Cl.[5] F16H *57/10*

U.S. Cl. 475—337 **4 Claims**



1. A planetary gear train comprising at least two planetary gear sets arranged coaxially, one behind the other, and drivingly connected with one another, each planetary gear set having a sun gear, a stationary ring gear and a plurality of planet gears, said plurality of planet gears being between and engaging their respective sun and ring gears, each of said sun and ring gears having teeth lying on a pitch circle having a pitch diameter, one of sid planetary gear sets containing less planet gears than the other planetary gear set, the planet gears of both planetary gear sets and their respective bearings being identical to each other, the planet gears of said one planetary gear set being arranged in a first lateral plane transverse to the common axis of the planetary gear train and the planet gears of the said other planetary gear set arranged in another lateral plane transverse to the common axis of the planetary gear train, the said pitch diameter of the sun gear and of the ring gear of the said other planetary gear set being larger than the pitch diameter of the sun gear and ring gear, respectively, of the said one planetary gear set with less planet gears, and wherein said sun gears and said ring gears have the same strength and thus both sets are designed to approximately the same line loading of the teeth of the sun gears, planet gears and ring gears, wherein line loading is defined as the force per face width in the contact line of two teeth bearing against each other.

4,926,716

METHOD OF CONTROLLING CONTINUOUSLY VARIABLE TRANSMISSION SYSTEM

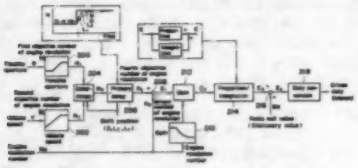
Sadayuki Hirano; Katsuaki Murano; Yoshinori Yamashita, all of Shizuoka; Takumi Tatsumi, and Hiroaki Yamamoto, both of Hyogo, all of Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of, Japan

Filed Aug. 8, 1988, Ser. No. 229,899

Claims priority, application Japan, Aug. 10, 1987, 62-199411

Int. Cl.[5] B60K *41/16*

U.S. Cl. 74—866 6 Claims



1. A method of controlling a continuously variable vehicle transmission which has a movable input part driven by an engine, a movable output part, and ratio control means for drivingly coupling said input part to said output part with a selected drive ratio from a range of drive ratios, said engine having speed control means for facilitating control of the speed of said engine, comprising the steps of:

detecting a state of said speed control means and determining as a function thereof a first objective engine speed;

detecting an actual vehicle speed and determining as a function thereof a second objective engine speed;

detecting which of a plurality of states a motion control selector is in and then selecting a predetermined engine speed range corresponding to said detected state of said motion control selector;

determining as a function of said first and second objective engine speeds a third objective engine speed which is within said selected engine speed range; and

causing said ratio control means to vary said selected drive ratio as a function of said third objective engine speed.

4,926,717

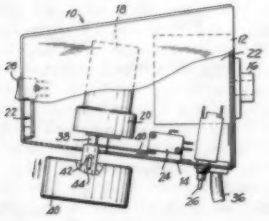
BOTTLE UNCAPPING AND RECAPPING MACHINE

Francis Gomes, Jersey City, N.J., assignor to Manostat Corporation, New York, N.Y.

Filed Sep. 5, 1989, Ser. No. 403,088

Int. Cl.[5] B67B *7/18*

U.S. Cl. 81—3.2 8 Claims



1. A machine for the removal and reapplication of threaded caps from bottles having a screw threaded neck, comprising:

a frame;

a reversible electric motor supported by said frame;

an output shaft of said motor;

a chuck supported on said output shaft for rotation in unison with said output shaft and moveable between a first and a second position longitudinally of said output shaft;

electronic controller means controlling said motor and supported on said frame;

micro switch means for signaling the electronic controller; and,

an actuator of said switch means extending into the path of axial movement of said chuck for actuating said switch means upon movement of said chuck from a first position to a second position;

whereby, an initial axial movement of said chuck in one direction will actuate said electronic controller to cause rotation of said electric motor in one direction, and, a subsequent axial movement of said chuck in said one direction will cause further actuation of said micro switch means to produce reversal of the direction of rotation of said reversible electric motor.

4,926,718

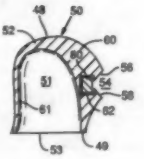
NAIL HOLDING TOOL

Graham R. Cook, Britannia Beach, Canada, assignor to Clifford Lawrence Goodman, Britannia Beach, Canada

Filed Mar. 8, 1989, Ser. No. 321,643

Int. Cl.[5] B25C *3/00*

U.S. Cl. 81—44 4 Claims



1. A nail holding tool, comprising:

(a) an impact resistant sheath having a top end and an open lower end, a longitudinal axis extending from said top end to said open lower end, said sheath having an inner wall surface forming a hollow interior region sized to fit snugly over a user's thumb, and an outer wall surface said inner wall surface having an upper thumb tip engaging surface portion adjacent said top end; and,

(b) a nail holding fixture means supported in the outer wall surface of said sheath in a position between said thumb tip engaging surface portions and said open lower end for holding a nail below the tip of said thumb in a position extending substantially transverse to the longitudinal axis of said sheath, such that

said sheath, when fitted on said thumb, can move with movement of said thumb between a position extending away from the user's hand and a position extending across the palm region of the user's hand to grip a nail held in the palm of the user's hand.

4,926,719

SUPPLEMENTARY DEVICE FOR INSERTING SCREWS BY MEANS OF A POWER-DRIVEN SCREW DRIVER

Manfred Kross, Iserlohn, and Hans J. Plumer, Hemer, both of Fed. Rep. of Germany, assignors to ITW-ATECO, GmbH, Norderstedt, Fed. Rep. of Germany

Filed Jun. 22, 1988, Ser. No. 209,893

Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3717959

Int. Cl.[5] B25B *13/02*

U.S. Cl. 81—57.37 18 Claims

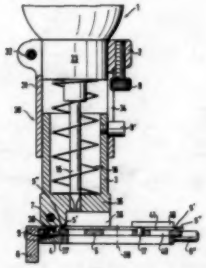
1. A supplementary device for driving fasteners by means of a tool having a longitudinal axis, comprising:

means coaxially disposed with respect to said tool for movably supporting said tool between a first retracted non-

driving position with respect to said fasteners at which said tool is out of engagement with said fasteners, and a second extended driving position with respect to said fasteners at which said tool is disposed in engagement with one of said fasteners so as to drive said one of said fasteners into a workpiece;

a base plate mounted upon said tool supporting means so as to extend substantially perpendicular with respect to said longitudinal axis of said tool supporting means and said tool;

index disc means removably mounted and rotatably indexable upon said base plate for supporting said fasteners at a plurality of loci which define a circular arc which intersects said longitudinal axis of said tool wherein each one of said fasteners disposed along said cricular arc can be coaxially disposed with said tool along said longitudinnal axis thereof as said index disc means is indexed upon said



base plate such that said tool can engage said one of said fasteners disposed at an arcuate position corresponding to said longitudinal axis of said tool when said tool is moved from said first retracted position to said second extended driving position so as to drive said one of said fasteners into said workpiece during performance of a fastener driving operation; and

magazine disc means releasably supporting said fasteners upon said index disc means for permitting said fasteners to be released from said magazine disc means and said index disc means as a result of axial pressure applied to said one of said fasteners, disposed at said arcuate position corresponding to said longitudinal axis of said tool, by said tool as said tool engages said one of said fasteners as a result of being moved from said first retracted position to said second extended driving position during performance of said fastener driving operation.

4,926,720

RACHET SPANNER WITH OPEN MOUTH

Kurt Srzanna, Berlin, Fed. Rep. of Germany, assignor to Peter Wolter, Leonberg, Fed. Rep. of Germany

Continuation of Ser. No. 24,303, Mar. 10, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 256,200

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1986, 3609118; Mar. 25, 1986, 3610508

Int. Cl.[5] B25B *15/04*

U.S. Cl. 81—61 **21 Claims**

1. A ratchet spanner comprising:

a handle;

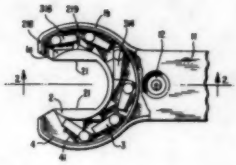
said handle including a head portion having upper and lower walls defining a space therebetween, and an opening for engaging an element to be rotated, said head portion including a side wall bordering said space;

said upper wall having a plurality of first apertures and said lower wall having a like plurality of second apertures;

a plurality of pawls pivotally mounted in said head portion adjacent said side wall;

each of said plurality of pawls having at least a pair of integral support posts, one of said support posts on each pawl being received in a respective one of said plurality of first apertures and the other of said pair of support posts being received in a respective one of said plurality of second apertures, whereby each one of said plurality of pawls is mounted on said head portion for pivotal movement with respect thereto;

a ratchet insert member in said space and rotatable with respect to said head portion, said ratchet insert member including a plurality of teeth engageable by respective ones of said plurality of pawls, said ratchet insert member having spaced gripping surfaces adapted for gripping a nut or the like, and



spring biasing means disposed in said space between said side wall and each of said plurality of pawls, said spring biasing means being engageable with said plurality of pawls for biasing each of said plurality of pawls into operative engagement with respective ones of said teeth, said spring biasing means including a sheet-like arcuate member adjoining said side wall having a plurality of spring members partially cut-out from said arcuate member which are biased into engagement with respective ones of said pawls to pivot each of said pawls into engagement with respective ones of said teeth.

4,926,721

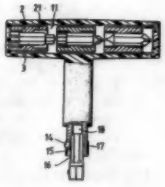
MULTIPURPOSE HAND TOOL STRUCTURE

K. H. Hsiao, No. 4, Lane 11, Tzu Chiang St., Tu Cheng Shiang, Taichung Shien, Taiwan

Filed Jun. 29, 1989, Ser. No. 372,762

Int. Cl.[5] B25G *1/08*

U.S. Cl. 81—177.4 **6 Claims**



1. A multi-purpose hand tool structure comprising:

(a) a hollow handle portion for storing a plurality of sockets therein;

(b) a plurality of sockets for storage within the hollow handle portion;

(c) a socket connector

(d) each socket including a first hole at one end thereof for engagment* with said socket connector, a second hole at another end thereof for engaging a fastener head, and a middle through hole extending between the first and second holes, each middle through hole having an inner diameter sized to receive a cylindrical tool part therein;

(e) a cylindrical tool part disposable within the middle through hole of each socket, wherein the sockets and their corresponding tool parts may collectively be stored within the hollow handle portion; and

(f) engaging means for detachably selectively securing said

socket connector or one of said tool parts to the tool structure.

4,926,722

QUICK-ACTION BAR CLAMP

Joseph A. Sorensen, and Dwight L. Gatzemeyer, both of Lincoln, Nebr., assignors to Petersen Manufacturing Co., Inc., DeWitt, Nebr.

Filed Aug. 19, 1988, Ser. No. 234,173
Int. Cl.[5] B25B 5/02
U.S. Cl. 81—487 **24 Claims**

1. A quick-acting bar clamp comprising:
a fixed jaw;
a movable jaw for opposing said fixed jaw;
a slide bar, said movable jaw being mounted on one end of said slide bar, said slide bar being movable to bring said movable jaw toward and away from said fixed jaw;
support means for supporting said slide bar, said fixed jaw being connected to said support means;
one-way drive means for releasably engaging and, when engaged, for advancing said slide bar and attached movable jaw, said movable jaw being subject to advancement toward said fixed jaw when said one-way drive means is disengaged;
said one-way drive means having a driving lever, and a braking lever normally engaging said slide rod, said braking lever when engaging said slide bar preventing motion of said movable jaw away from said fixed jaw, and when disengaging said slide bar allowing advancement of said movable jaw away from said fixed jaw, said braking lever having an engaging portion extending outwardly from said support means,
a trigger handle pivotably mounted to said support means rearwardly of said braking lever and contacting said driving lever,
said engaged driving lever moving said slide rod and said movable jaw toward said fixed jaw,
said support means including a handgrip, a trigger-type relationship existing between said trigger handle and said handgrip, said bar clamp being holdable at said handgrip, said braking lever and the trigger handle being selectively operable by the same hand in such a manner that one of the index and middle fingers is positioned on the engaging portion of the braking lever to actuate the braking lever, while the other fingers encircle and contain the trigger handle and the handgrip.

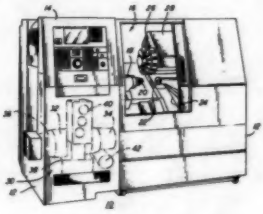
4,926,723

MACHINE TOOL AUXILIARY FUNCTION HYDRAULIC SYSTEM

Henry Lothammer, Manlius, N.Y., assignor to Ralph Earl Co., Inc., Syracuse, N.Y.

Filed Dec. 6, 1988, Ser. No. 280,571
Int. Cl.[5] B23B 23/00, 7/04
U.S. Cl. 82—118 **5 Claims**

1. Modular hydraulic assembly for an automated machine tooler of the type that has a rotary spindle that carries a collet into which a workpiece can be secured, a tailstock which is movable forward to contact said workpiece and movable away from the workpiece to a home position, a spindle brake which is held out of engagement with said spindle to permit rotation thereof and is urged into braking engagement with said spindle to halt said rotation, and a rotary tool turret for holding a plurality of tools at respective rotary positions thereon, said turret being rotatable to bring a desired one of said tools into position to machine said workpiece, including a turret clamp which is movable between an unlock position to permit rotation of the turret and a lock position to hold the turret against rotation; said modular hydraulic assembly comprising a hydraulic circuit which includes a reservoir, a hydraulic pump, a pressure supply line carrying pressurized hydraulic fluid from said hydraulic pump, a return line carrying fluid to said reservoir, an accumulator coupled to said supply line for storing a quantity of said fluid substantially at the pressure of said pump; and a tailstock cylinder assembly which comprises a cylinder coupled to said tailstock and having first and second hydraulic connections to be coupled to said supply and return lines; a



tailstock valve coupled between said supply and return lines and the hydraulic connections of said cylinder, and having forward position, a neutral position, and a home position, in said forward position said return line and said supply line being connected respectively to said first and second hydraulic connections, and in said home position said supply line and said return line being connected respectively to said first and second hydraulic connections a tailstock pressure regulator disposed between said supply line and said valve providing a reduced hydraulic pressure through said valve to said cylinder; pressure sensing means for sensing the hydraulic pressure at said first hydraulic connection of said tailstock cylinder for detecting a pressure drop thereat to indicate contact of the tailstock with said workpiece and supplying a tailstock-in-position signal; and means actuating said tailstock valve in response to said tailstock-in-position signal to halt movement of said cylinder when said tailstock contacts said workpiece.

4,926,724

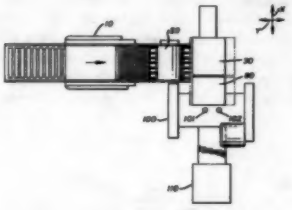
METHOD AND APPARATUS FOR MULTIDIRECTIONAL SHEET FEEDING

Joseph D. Bulso, Jr., Canton, and William R. Lewers, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio

Filed Sep. 20, 1988, Ser. No. 246,772
Int. Cl.[5] B65H 5/16
U.S. Cl. 83—35 **11 Claims**

9. A method of feeding sheets of material into a press comprising the steps of:
(a) depositing a first sheet of material on a feeder disposed adjacent the press;
(b) feeding the sheet into the press a predetermined distance in a first direction;
(c) performing a press operation on the sheet;
(d) moving the sheet in a second direction normal to the first;
(e) depositing a second sheet on a loader positioned adjacent the feeder remote from the press and in alignment with the feeder and the press along the direction of feed while said first sheet is on said feeder;
(f) repeating steps b through d until the press is ready to perform its last operation on said first sheet;

(g) moving said loader in said second direction until said first and second sheets are in alignment in said first direction; and



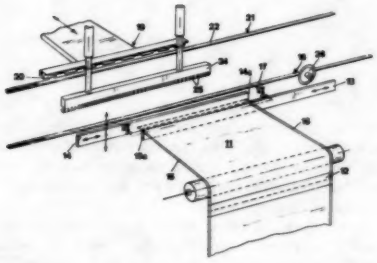
(h) simultaneously performing the last press operation on the first sheet while advancing the second sheet onto said feeder in said first direction.

4,926,725

DEVICE FOR ALIGNING AND CUTTING A WEB

Bernt Helgesson, Sandhult, Sweden, assignor to Akab of Sweden AB, Sweden

Filed Oct. 18, 1988, Ser. No. 259,051
Int. Cl.[5] D06H 7/02; B26D 7/14
U.S. Cl. 83—155 **7 Claims**



1. A system for handling a web which has longitudinal edges and alternating thick portions and thin portions, said system comprising:

first and second rulers for aligning the web with respect to a direction of travel of the web through said system, said rulers being elongated in a transverse direction which is substantially perpendicular to the direction of travel of the web through said system, said rulers being adjustably spaced apart so as to selectively (1) permit the thick portions and the thin portions of the web to pass between said rulers and (2) prevent the thick portions from passing between said rulers while permitting the thin portions to pass between said rulers, said rulers overlapping each other in the transverse direction so as to permit the longitudinal edges of the web to travel through said system without having to pass between said rulers, the extent to whic.. said rulers overlap each other in the transverse direction being adjustable so that said system can handle webs of different widths;

means for seizing a portion of the web and for transferring the web to a conveyor; and

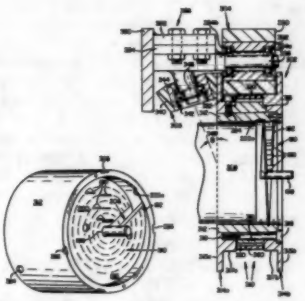
a pulling device for pulling the web in the direction of travel.

4,926,726

FOOD PROCESSING APPARATUS

John C. Julian, Richland, Wash., assignor to Lamb-Weston, Inc., Tri-Cities, Wash.

Continuation-in-part of Ser. No. 119,662, Nov. 12, 1987. This application Jan. 3, 1989, Ser. No. 292,926
Int. Cl.[5] B26D 3/11
U.S. Cl. 83—165 **25 Claims**



1. A rotary cutting apparatus used in food processing, comprising:

a substantially cylindrical cutter head assembly having an outer periphery, a cutting end, a discharge end and knife means mounted proximate said cutting end for slicing food items;

cutter head support means for supporting said cutter head assembly in a manner which permits said cutter head to rotate about a longitudinal axis, said support means including plural rotatable members in rolling contact with both said outer periphery and said discharge end, said cutter head assembly being supported only by said rotatable members; and

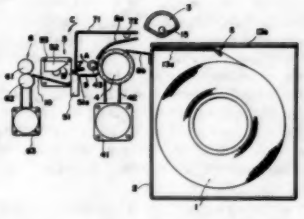
a drive belt frictionally engaging the outer periphery of said cutter head assembly and operable to apply a rotational force thereto.

4,926,727

CUTTING DEVICE FOR CUTTING STRIP OF RECORDING MEDIUM

Yutaka Maeda, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 11, 1988, Ser. No. 231,212
Claims priority, application Japan, Aug. 21, 1987, 62-127897
Int. Cl.[5] B26D 5/20
U.S. Cl. 83—203 **21 Claims**



1. A device, which is used as a feeder for cutting a strip of recording medium in the form of a roll into sheets and feeding each sheet, comprising:

delivery means for drawing out the strip of recording medium from the roll and for transporting the strip, said

delivery means being movable between a first position where the delivery means nips the strip and a second position where the delivery means is retracted from the strip;

cutting means disposed downstream from the delivery means with respect to the direction of delivery of the strip for cutting the strip into the sheet as transported by the delivery means by a specified length;

holding means provided between the delivery means and the cutting means for holding the leading end of the strip drawn out by the delivery means from the roll; and

control means for controlling operation of the delivery means and holding means, for first energizing the holding means to hold the leading end of the strip from the roll after a cutting operation of said cutting means and for thereafter retracting the delivery means to the second position, and for causing the leading end of the strip to be held by the holding means and said delivery means to be retracted from the strip to the second position until a successive drawing out operation of said delivery means.

4,926,728

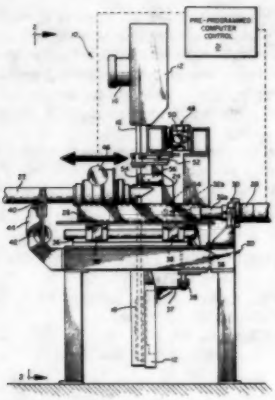
BAND SAW POR CUTTING SHAPED PIECES OF BAR STOCK

James Kawabata, Niles, Ill., assignor to Contour Saws, Inc., Des Plaines, Ill.

Continuation of Ser. No. 904,157, Sep. 5, 1986, abandoned. This application Feb. 28, 1989, Ser. No. 316,984

Int. Cl.[5] B23D *53/08, 55/04, 55/08;* **B26D** *13/10*

U.S. Cl. 83—251 **8 Claims**



1. A band saw machine capable of making a plurality of saw cuts at any selected portion and to any selected depth along the entire length of a piece of bar stock comprising:

a band saw blade assembly having a saw blade and driving wheels mounted to a frame to permit movement of the band saw blade assembly in a direction generally perpendicular to the longitudinal axis of the bar stock;

a servo motor connected to the band saw blade assembly to provide movement to the band saw blade assembly in a direction generally perpendicular to the longitudinal axis of the bar stock;

a collet assembly comprising a rotatable collet connected to a gear assembly and a servo motor to enable the collet to rotate the piece of bar stock up to 360 degrees;

a bearing assembly comprising linear bearings and a servo motor connected to the collet assembly to provide movement to the collet assembly and bar stock in a direction generally parallel to the longitudinal axis of the bar stock;

an index vise assembly for moving the bar stock longitudinally through the collet in a direction generally parallel to the longitudinal axis of the bar stock;

a saw blade twist assembly for twisting the saw blade through an arc of generally 90 degrees; and

an automated control means connected to all servo motors for coordinating the movements of the band saw blade and the bar stock to enable the band saw blade to make selected cuts to any selected depth along any selected portion of the entire length of the piece of bar stock.

4,926,729

ENVELOPE OPENER

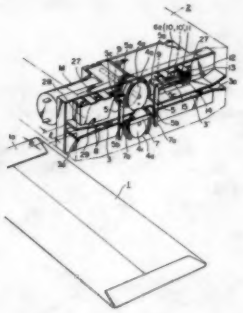
Hideo Igarashi, Tokyo, Japan, assignor to Elm Industry Co., Ltd., Tokyo, Japan

Filed Aug. 8, 1989, Ser. No. 390,854

Claims priority, application Japan, Sep. 5, 1988, 63-115895

Int. Cl.[5] B26D *5/38, 1/14*

U.S. Cl. 83—364 **1 Claim**



1. A double-entry type envelope opener provided with a pair of entries in its opposite sides through which an envelope may enter said opener from either side to have its head automatically cut as it passes through said opener, comprising:

a reversible electric motor;

a pair of rotary disc blades driven by said reversible electric motor, said rotary disc blades being vertically arranged;

a guide lane extending horizontally for guiding said envelope, said guide lane being interrupted by said pair of rotary disc blades so that said pair of rotary disc blades cross said guide lane;

a pair of bar-type swingable sensors vertically mounted in said guide lane to cross the lane, said bar-type swingable sensors being positioned in opposite sides of said pair of rotary disc blades;

a link connecting said pair of bar-type swingably sensors with each other to move them in synchronism when one of them is swung by an envelope passing through said guide lane; and

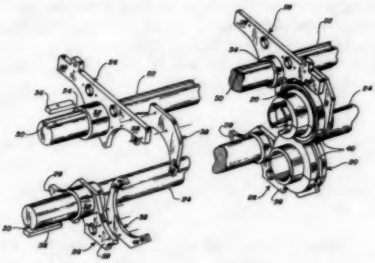
a pair of contact assemblies coupled with said pair of bar-type swingable sensors, one of said contact assemblies being operated by one of said bar-type swingable sensors to establish rotational directions of said reversible electric motor and said rotary disc blades when the head of an envelope enters said opener from either side and passes said guide lane in either direction to swing one of said bar-type swingable sensors, the other of said bar-type swingable sensors being swung through said link into a position where the other of said contact assemblies coupled with the other of said bar-type swingable sensors remains opened or turned off.

4,926,730

GUIDE FOR SLOTTING, SCORING, TRIMMING OR LIKE HEADS

Jimmy R. Garrett, Rte. 1, Box 569, Worden, Ill. 62097

Filed Aug. 30, 1988, Ser. No. 238,204
Int. Cl.[5] B26D *3/08, 1/24*
U.S. Cl. 83—499 **7 Claims**



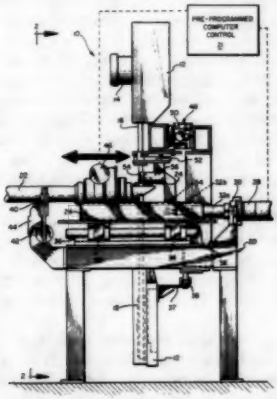
1. A guide for slotting, scoring, trimming or like heads, said heads having a peripheral groove with a bottom and sidewalls and said guide including a plate with an arcuate bearing surface adapted to ride along the bottom of the peripheral groove provided therefor in the heads, said plate having opposite side faces and being thinner in crosssection than the groove is wide, said plate further having a plurality of recesses in the opposite side faces into which rollers are mounted for rotation off a side centerline of said plate, at least some portion of which rollers include means for adjustment of the roller's axis of rotation towards or away from the sidewalls of the groove.

4,926,731

BAND SAW FOR CUTTING SHAPED PIECES OF BAR STOCK

James Kawabata, Niles, Ill., assignor to Contour Saws, Inc., Des Plaines, Ill.

Division of Ser. No. 904,157, Sep. 5, 1986, abandoned. This application Jan. 30, 1989, Ser. No. 304,345
Int. Cl.[5] B23D *55/04;* B27B *13/00*
U.S. Cl. 83—789 **3 Claims**



1. An index vise assembly mounted to a band saw machine for controlling the indexing and longitudinal movement of a piece of bar stock being cut by a band saw blade comprising:

a pair of movable arms to which hardened jaws are mounted,

a threaded rod extending through the arms and providing the means for adjusting the position of the arms to accommodate varying sizes of bar stock,

a short stroke air cylinder mounted to the lower portion of one of the movable arms,

an adjusting means journaled through the lower portion of the moveable arm not supporting the air cylinder and abutting against the air cylinder, and

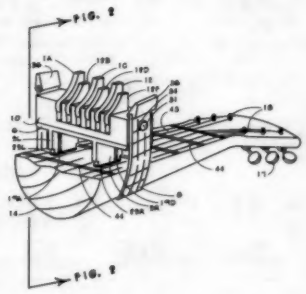
computer control means for engaging and disengaging the air cylinder, so that the bar stock may be indexed longitudinally forward.

4,926,732

VARIABLE CHORD-FORMING CAPOTASTO

William D. Collins, Eagle's Aerie Farm, Rustic Hills Rte. 4, and Jeremiah Sundown, Rte. 4, both of Ashland City, Tenn. 37015

Filed Jun. 16, 1989, Ser. No. 367,485
Int. Cl.[5] G10D *3/04*
U.S. Cl. 84—318 **9 Claims**



1. A variable chord-forming capotasto, comprising:

a body;

means for releasably mounting said body to the neck of a stringed musical instrument; and

a plurality of string stopping means, one for each string on said instrument, said plurality of string stopping means being oriented on said body to engage the strings adjacent a selected fret, each of said string stopping means comprising a string engaging means individually actuated to depress the respective string into contact with said adjacent fret, and a cam lever pivoted on said body to selectively actuate said string engaging means and to lock said string engaging means in the actuated state.

4,926,733

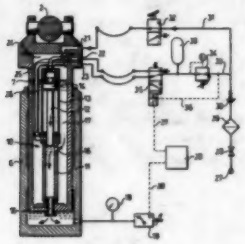
SAW BLADE TENSIONING ARRANGEMENT

Kurt Jansson, Mariannelund, Sweden, assignor to Aktiebolaget A.K. Eriksson, Mariannelund, Sweden

Filed May 22, 1989, Ser. No. 362,440
Claims priority, application Sweden, Nov. 27, 1986, 8605093; PCT Int'l Appl., Nov. 19, 1987, PCT/SE87/00543
Int. Cl.[5] B23D *55/10;* B27B *13/08*
U.S. Cl. 83—819 **10 Claims**

1. A saw-blade tensioning arrangement for band saws and like machines, including a hydraulic cylinder (6) having movably arranged therein a piston (7) which is intended to activate saw-blade tension regulating means (2), so that the blade tension becomes dependent on the hydraulic pressure in the cylinder (6), characterized by means for pneumatically controlling the hydraulic pressure, these means including a pneumatically

operated pressure booster (10), and means (19, 20, 35) for activating the pressure booster (10) at the end of a working



stroke of the hydraulic piston (7), so as to tension the saw blade (5) to a desired working tension.

4,926,734

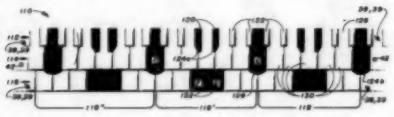
GRAPHIC/TACTILE MUSICAL KEYBOARD AND NOMOGRAPHIC MUSIC NOTATION

James C. Rickey, 16000 NE. 4th, Bellevue, Wash. 98008

Continuation-in-part of Ser. No. 59,606, Jun. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 827,515, Feb. 10, 1986, abandoned. This application Aug. 25, 1988, Ser. No. 236,459

Int. Cl.[5] G10C *3/12*

U.S. Cl. 84—423 R 18 Claims



1. A graphic/tactile musical instruction system, comprising:

tone producing means for producing a musical note in response to the actuation of a selected key of a keyboard;

a graphic/tactile keyboard wherein actuation of any two adjacent keys within a single row causes the tone producing means to produce two musical notes separated by a whole tone, and actuation of any two adjoining keys in adjacent rows produces two musical notes separated by a half-tone, the keyboard having:

an upper row of keys positioned relatively farther away from the player, the upper row keys producing the notes $C^{\sharp}/D_{\flat}$, $D^{\sharp}/E_{\flat}$, F, G, A and B, wherein adjacent upper row keys are separated by a gap, and wherein selected upper row keys are graphically and tactilely differentiated from the remaining upper row keys, the upper row keys in a predetermined one or more highest octaval groupings being narrower than the upper row keys in octaval groupings below said narrower keys;

a middle row of keys positioned lower and relatively closer to the player than the upper row, the middle row keys producing the notes C, D, E, $F^{\sharp}/G_{\flat}$, $G^{\sharp}/A_{\flat}$ and $A^{\sharp}/B_{\flat}$, wherein a longitudinal centerline of each middle row key is parallel to and laterally offset from the longitudinal centerline of an adjacent upper row key, and wherein the middle row keys have a uniform width approximately equal to the width of any selected one of the upper row keys plus the width of the gap separating the upper row key from an adjacent upper row key, and wherein selected middle row keys are graphically and tactilely differentiated from the remaining middle row keys; and

a lower row of keys positioned lower and relatively closer to the player than the middle row, wherein the longitudinal centerline of each of said lower row keys is aligned with the longitudinal centerline of a corresponding upper row key which produces the same note as said lower row key, wherein said lower row keys have a uniform width equal to the uniform width of the middle row keys, and wherein the frontmost ends of all said lower row keys are coplanar; and

a nomographic music notation system comprising musical notation wherein notes to be played on one row of the keyboard are graphically marked while notes to be played on another row of the keyboard are unmarked, said notation system, in addition to conventional key signature symbols, including in the key signature area nomographic symbols indicating the lines and spaces on which said graphically marked notes occur.

4,926,735

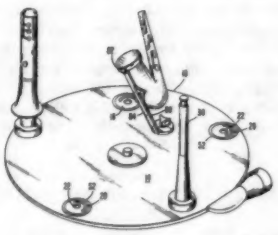
HEATED ROTATABLE MUSICAL INSTRUMENT STAND

Gary Smith, 256 W. 5th Ave., Collegeville, Pa. 19426, assignor to Mobile Music, Inc., Horsham; Gary Smith, Collegeville and Joseph Stefano, Oreland, all of, Pa.

Filed Feb. 3, 1989, Ser. No. 305,587

Int. Cl.[5] G10G *5/00*

U.S. Cl. 84—453 20 Claims



1. A heated rotatable musical instrument stand comprising:

(a) a base member defining a base inlet therein;

(b) a platform member rotatably mounted with respect to said base member to be separately rotatable with respect thereto, said platform member and said base member cooperating to define a heated air chamber therebetween in fluid flow communication with respect to said base inlet, said platform member further defining a plurality of mounting stations thereon, each mounting station including a mounting outlet means in fluid flow communication with respect to said heated air chamber to allow heated air to exit therefrom;

(c) a heating means in fluid flow communication with respect to said heated air chamber to supply heated air thereto;

(d) at least one instrument support member being detachably attached with respect to said mounting station on said platform member to facilitate retaining of a musical instrument thereon, said instrument support member being positioned adjacent said mounting outlet means to be heated by air exited therefrom, said instrument support member being rotatable with said platform member to facilitate instrument selection; and

(e) an outlet closing means positioned adjacent to each of said mounting outlet means and having a steady state closed position extending thereover to close said mounting outlet means and prevent air flow therethrough, said outlet closing means being adapted to be urged to the opened position responsive to said instrument support member being attached with respect to said mounting station to allow flow of heated air to said instrument support member.

4,926,736

ELECTRONIC MUSICAL INSTRUMENT WITH AUTOMATIC PERFORMANCE APPARATUS

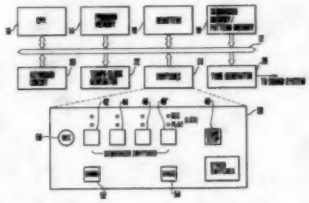
Koichi Kozuki, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Jun. 22, 1988, Ser. No. 210,030

Claims priority, application Japan, Jun. 25, 1987, 62-156600; Jun. 25, 1987, 62-156601

Int. Cl.[5] G10H *1/36, 7/00*

U.S. Cl. 84—609 13 Claims



12. An electronic musical instrument, comprising:

means for designating performance data for plural performance parts of a musical piece;

means for generating tones in accordance with designated performance data, including plural tone generation channels;

means for independently designating at least one tone generating channel for each performance part;

means for assigning each performance part to at least one available tone generation channel, the number of available tone generation channels for a particular performance part being equal to the number of tone generation channels designated for the particular performance part.

4,926,737

AUTOMATIC COMPOSER USING INPUT MOTIF INFORMATION

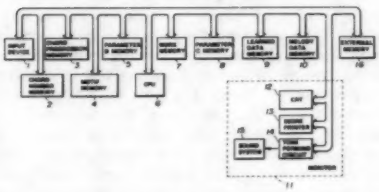
Junichi Minamitaka, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 4, 1988, Ser. No. 177,592

Claims priority, application Japan, Apr. 8, 1987, 62-86571; May 20, 1987, 62-121037; Jun. 12, 1987, 62-145405; Jun. 15, 1987, 62-146963

Int. Cl.[5] G10H *1/38, 1/42, 7/00*

U.S. Cl. 84—611 62 Claims



1. An automatic composer comprising:

input means for providing motif information for composing a melody;

motif analyzer means for extracting motif-featuring parameters characterizing said motif information;

chord data source means for providing chord progression information; and

melody forming means for composing melody data in accordance with said motif-featuring parameters and also in accordance with said chord progression information.

4,926,738

ELECTRONIC RHYTHM PERFORMING APPARATUS GENERATING BOTH MANUAL AND AUTOMATIC RHYTHM TONES

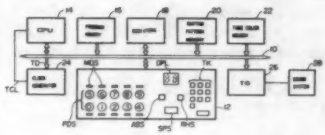
Masao Kondo, and Yasunao Abe, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Jan. 4, 1989, Ser. No. 293,219

Claims priority, application Japan, Jan. 6, 1988, 63-1082

Int. Cl.[5] G10H *1/22, 1/42, 7/00*

U.S. Cl. 84—618 14 Claims



1. An electronic rhythm performing apparatus, comprising:

(a) memory means for storing a rhythm pattern;

(b) automatic rhythm generating means for automatically generating an automatic rhythm signal representing an automatic rhythm performance in accordance with said rhythm pattern;

(c) manual rhythm generating means for generating a manual rhythm signal representing a manual rhythm performance in accordance with a manual operation thereof; and

(d) control means for restraining said automatic rhythm signal during a predetermined time interval in response to said manual rhythm performance so that said manual rhythm performance has priority over said automatic rhythm performance for the predetermined time interval.

4,926,739

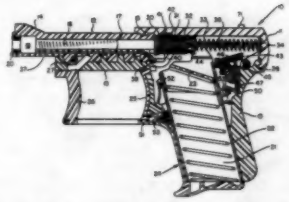
POLYMER GUN OPERATING HANDLE

David E. Byron, Casselberry, Fla., assignor to Red Eye Arms, Inc., Winter Park, Fla.

Continuation of Ser. No. 149,914, Jan. 27, 1988, abandoned, which is a continuation of Ser. No. 362, Jan. 5, 1987, abandoned, which is a division of Ser. No. 702,655, Feb. 4, 1985, Pat. No. 4,703,826. This application Mar. 10, 1989, Ser. No. 320,900

Int. Cl.[5] F41D *11/00*

U.S. Cl. 89—1.4 2 Claims



1. A weapon apparatus comprising in combination:

upper and lower polymer receivers;

a polymer bolt slidably mounted in said upper receiver and having a bolt spring;

a polymer hammer slidably mounted in said upper receiver and having a hammer spring;

a trigger;

an ammunition feed system;

a sear assembly having a sear therein;

a locking block for locking said bolt; and

an operating handle separate from said bolt and forming the forward member of a trigger guard, means slidably

mounting said operating handle on the lower polymer receiver, said operating handle having a top slide extending angularly upward and backward therefrom, such that when the operating handle is pushed rearward, said top slide impinges on said locking block to unlock the bolt and drives said hammer and bolt to a position where said hammer is engaged by the sear and said operating handle is released to let said bolt drive a cartridge in said ammunition feed system into the chamber.

4,926,740

LAUNCHERS FOR AIRBORNE MISSILES

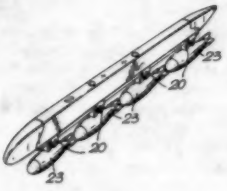
Dennis Griffin, and John R. Pearce, both of Surrey, England, assignors to Frazer-Nash Defence Systems Limited, England

Continuation of Ser. No. 139,774, Dec. 30, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,227

Claims priority, application United Kingdom, Dec. 31, 1986, 8631067

Int. Cl.[5] F41F *3/04, 3/052, 3/06, 7/00*

U.S. Cl. 89—1.819 **10 Claims**



1. A convertible rail launcher to carry airborne missiles or other airborne stores, comprising:

an elongated main launcher body for attachment to an aircraft to lie in a direction generally fore and aft of the aircraft,

a plurality of individual hook modules including a first cooperating attachment member at the top thereof each said hook module including a releasable suspension hook for carrying an airborne store,

hook-operating means for selectably releasing the hook to cause it to drop a store carried thereby,

interface means for supporting and securing said hook modules on said launcher body along the underside thereof said interface means including a second cooperating attachment member where said first and second attachment members cooperate to effect releasable attachment of the hook modules to the launcher body at selected positions along said interface means, and

a missile carrying sub-rail capable of substitution for the hook modules on said interface upon removal of said hook modules, said sub-rail including a first cooperating attachment member at the top thereof.

4,926,741

APPARATUS FOR DRIVING A COIL LAUNCHER

Zivan Zabar, Forest Hills, N.Y., assignor to Polytechnic University, Brooklyn, N.Y.

Filed Dec. 12, 1988, Ser. No. 283,254

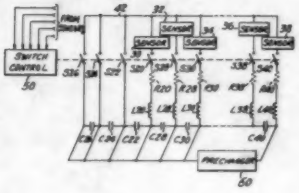
Int. Cl.[5] F41F *1/02*

U.S. Cl. 89—8 **15 Claims**

1. Apparatus for driving a coil launcher of the type having multiple energizable coils arranged in sections to drive a projectile therewithin and unconnected to said coils, said apparatus comprising a plurality of pre-energized capacitance means cumulatively connected, one-at-a-time to sequential individual ones of said coil sections to add energy stored on previously connected capacitance means to the energy stored on the capacitance means next connected, whereby increasing energy at increasing AC frequency is supplied to successive ones of said coil sections, the improvement comprising

a number of switch means connected to respective ones of said capacitance means; and

means for activating said switch means one-at-a-time to cumulatively connect said capacitance means for supplying increasing energy concurrently to a predetermined plurality of said coil sections, the capacitance of the cumulatively connected capacitance means and the inductance of the predetermined plurality of coil sections determining a resonant frequency which increases as said capacitance means are cumulatively connected.



4,926,742

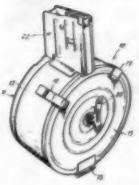
SPIRAL DRUM MAGAZINE WITH ELONGATED MAGAZINE CLIP AND SINGLE PIECE LAST ROUND FOLLOWER

Bao P. Ma, Atlanta, Ga.; Zhong Shou-Fu, Shandong, and Qin Z. Li, Gunmin, China, assignors to Poly Technologies, Inc., Beijing, China

Continuation-in-part of Ser. No. 920,046, Oct. 16, 1986, Pat. No. 4,745,842. This application May 24, 1988, Ser. No. 198,061

Int. Cl.[5] F41D *10/42*

U.S. Cl. 89—33.02 **13 Claims**



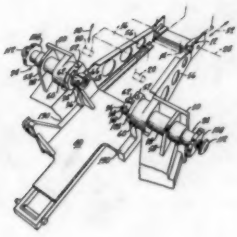
9. A magazine for feeding rounds of ammunition to an automatic weapon with said magazine comprising a drum, an outlet opening formed in said drum for passing rounds of ammunition from said drum, a clip magazine mounted to said drum about said outlet opening for passing rounds of ammunition radially from said drum to the weapon, a rotor for moving rounds of ammunition in a circular path toward said drum outlet opening, with said rotor comprising a pair of rotor plates maintained in spaced parallel relationship by a plurality of connector pins, said plates defining a plurality of circumferentially spaced radially outwardly facing slots for receiving rounds of ammunition, and a last round follower formed in a single piece and being positioned between said rotor plates and having a width less than the space between the rotor plates so as to be movable between said plates, said last round follower being pivotably connected at one end to inwardly opposing sides of said plates with the other end of said last round follower including a protrusion extending laterally through an opposing set of said radially outwardly facing slots.

4,926,743

QUICK RELEASE GUN MOUNT ASSEMBLY

Richard E. Dodd, Santa Ana, Calif., assignor to North American Dynamics, Tustin, Calif.

Filed Jun. 26, 1989, Ser. No. 371,130
Int. Cl.[5] F41A 27/08
U.S. Cl. 89—40.14 10 Claims



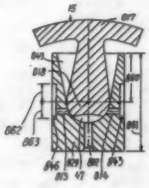
1. Gun mounting apparatus comprising:
coaxial gun fittings disposed on a gun;
a mating bracket disposed on said gun in a spaced apart relationship with said coaxial gun fittings;
quick release means for both engaging said coaxial gun fittings and enabling gun rotation thereabout; and
pivotable shoe means for slidably engaging the mating bracket and for supporting a substantial amount of the gun weight in order to facilitate movement of the gun and engagement of the coaxial gun fittings with the quick release means.

4,926,744

RADIAL PISTON HYDRAULIC MACHINE WITH PISTON HAVING TWELVE CIRCUMFERENTIAL FLUID BEARING POCKETS

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Continuation-in-part of Ser. No. 799,688, Nov. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 419,375, Sep. 17, 1982, abandoned, which is a division of Ser. No. 110,080, Jan. 7, 1980, Pat. No. 4,478,733, which is a division of Ser. No. 765,221, Feb. 3, 1977, Pat. No. 4,193,336, which is a continuation-in-part of Ser. No. 528,346, Nov. 29, 1974, Pat. No. 4,037,523. This application Mar. 28, 1988, Ser. No. 174,292
Int. Cl.[5] F01B 9/06, 13/06; F01M 1/06
U.S. Cl. 92—58 5 Claims



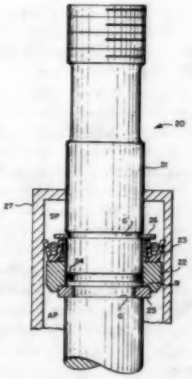
3. A piston and piston shoe arrangement for a radial piston machine wherein fluid flows through substantially radially directed cylinders, comprising, in combination,
pistons for reciprocation in said cylinders and piston shoes to be borne by said pistons and to be guided by a piston stroke guide ring while said piston shoes have outer and inner portions with said inner portions forming pivot portions with pivot faces of equal radii around pivot centers and with said outer portions forming slide faces to slide along a guide face of said piston stroke ring whereby said guide face holds said slide faces and said piston shoes parallel to a medial plane which is normal to the axis of the rotor which has said cylinders, while said pistons have in their outer ends hollow spherical pivot beds with bed faces of said radii and complementary configuration relative to said pivot faces to pivotably bear thereon said pivot portions of said piston shoes;
wherein said pistons are freely revolvable relative to said piston shoes due to the part spherical configurations of said beds and pivot portions;
wherein bores through said pistons communicate said beds with said cylinders;
wherein said pistons have outer faces to be guided on the inner faces of said cylinders and to seal said cylinders by close fits of said outer faces on said inner faces, while at least twelve peripheral angularly spaced pockets are provided through said outer faces into said pistons respective to the axes of said pistons at least partially radially of said pivot centers,
wherein passages extend from said pockets through portions of said pistons towards said bed and through said bed face, and;
wherein control recesses are provided in said pivot portions with said recesses extended parallel to said medial plane while they are narrow parallel to said axis of said rotor to communicate and discommunicate alternately during each revolution of said rotor and completion of a pivotal movement of said piston shoe on said piston said recesses with those of said passages which meet said recesses during said pivotal movement;
whereby fluid under pressure is passed from said cylinders through said bores, recesses and passages into those of said pockets which are close to said plane to exert forces onto said pistons which oppose forces which are exerted onto said pistons by said piston shoes during said pivotal movements of said shoes.

4,926,745

PULL ROD ASSEMBLY

Oliver C. Cioletti, Pittsburgh, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 21, 1988, Ser. No. 184,327
Int. Cl.[5] F16J 1/00
U.S. Cl. 92—256 4 Claims



4. In a piston and rod assembly having a rod, a piston means disposed on said rod, and locking means for locking said piston means onto said rod, said locking means including first and second axially spaced grooves in said rod, a recess extending into said piston means, a first locking member disposed in said first groove and extending radially therefrom and into said

recess, a second locking member disposed in said second groove and extending radially therefrom into engagement with that portion of said piston means disposed adjacent to said second groove, the improvement comprising:

a piston means comprising a cylindrical adapter surrounding said rod and having first and second end portions respectively abutting said first and second locking members, wherein said recess is formed in said first end portion and said second end portion having an inwardly extending shoulder portion formed therein and said piston means further comprising a seal member disposed between said shoulder portion and said second locking member.

4,926,746

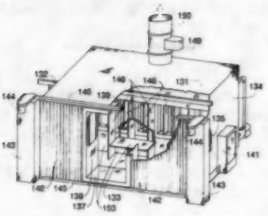
WORK CHAMBER WITH SHIFTING VENTILATION ZONE

Clyde M. Smith, 1705 Green Hills Dr., Nashville, Tenn. 37215

Continuation-in-part of Ser. No. 141,097, Jan. 5, 1988, abandoned. This application Jan. 18, 1989, Ser. No. 298,042

Int. Cl.[5] B05B *15/12*

U.S. Cl. 98—115.2 25 Claims



1. In a ventilated work chamber large enough to accommodate a worker and allow him to move about in the chamber and perform work activity in different locations in the chamber, said chamber being equipped with means for passing ventilating air through the chamber in a direction that is substantially perpendicular to a cross section of the chamber, at least a portion of said ventilating air being fresh air, and said air exiting the chamber through an exhaust face, and said chamber including means for exhausting to the atmosphere at least part of the air that exits the chamber, the improvement wherein the chamber includes (a) means for recirculating at least part of such ventilating air through the chamber, (b) a mobile, open cab operable to carry the worker from one location to another in the chamber and hold the worker as he performs his work activity in different locations in the work zone of the chamber, said cab having a rear portion and a front portion, and (c) means for delivering the fresh air to said cab from the rear, said cab and delivery means serving to substantially confine the fresh air component of the ventilating air passing through the chamber to a zone having a smaller cross section than the said cross section of the chamber, as well as to permit shifting of the location of said zone of moving fresh air about the chamber as the work activity shifts about the chamber, so as to be able to constantly maintain a flow of fresh air through the location of the work activity, even thought said location moves from place to place in the plane of the cross section of the chamber.

4,926,747

APPARATUS FOR MANUFACTURING SOY SAUCE

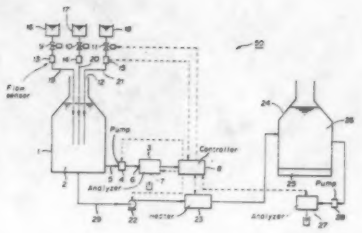
Hikotaka Hashimoto, and Kunio Kobayashi, both of Chiba, Japan, assignors to Kikkoman Corporation, Japan

Division of Ser. No. 173,373, Mar. 25, 1988, Pat. No. 4,888,190. This application Sep. 21, 1989, Ser. No. 411,392

Claims priority, application Japan, Mar. 25, 1987, 62-68942

Int. Cl.[5] B23Q *15/00*

U.S. Cl. 99—486 7 Claims



1. An apparatus for manufacturing soy sauce comprising:

at least one storage tank for storing a predetermined amount of raw soy sauce;

a sampling mechanism for sampling a portion of the predetermined amount of raw soy sauce;

an automatic multiple analyzer for receiving said portion of the predetermined amount of raw soy sauce from said sampling mechanism and simultaneously analyzing the concentration of at least two ingredients of the sampled portion of the raw soy sauce;

at least one control tank operatively communicating with said storage tank for storing at least one ingredient and supplying said at least one ingredient to the raw soy sauce in said storage tank;

control valves operatively coupled between said control tank and said storage tank for controlling the amount of the at least one ingredient to be supplied to the raw soy sauce in said storage tank;

control means operatively connected to said automatic multiple analyzer and said control valves for selectively opening and closing said control valves according to analytic results from said automatic multiple analyzer thereby to add the at least one ingredient to the raw soy sauce in said storage tank to adjust the concentrations of the at least two ingredients of the predetermined amount of raw soy sauce to target values; and

a mechanism for subsequently processing the raw soy sauce thus adjusted in said storage tank to obtain product soy sauce.

4,926,748

FRAMEWORK FOR SUPPORTING AND TYING STACKED WASTE PAPER AND NEWSPAPER

June Smith, and Steve Smith, both of 177 Viewbank Crescent, Oakville, Ontario, Canada (L6L 1R3)

Filed May 26, 1989, Ser. No. 357,245

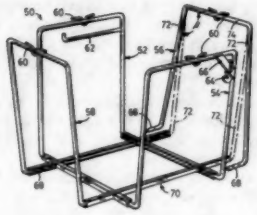
Claims priority, application Canada, May 27, 1988, 567980

Int. Cl.[5] B65B *13/00*

U.S. Cl. 100—34 8 Claims

1. Structure for the temporary storage of waste paper, the structure comprising two pairs of upstanding sides adapted to locate paper in a stack, and a bottom side to support the stack, the upstanding sides having respective anchor means to retain the ends of filament for securing said stack in a bundle, each pair of upstanding sides being fabricated from respective lengths of wire rod of which the ends are joined to form a closed substantially rectangular loop, each loop being bent upwardly at opposite ends to define said upstanding sides, and intervening portions of the loops being disposed one above the

other at right angles to each other to define upper and lower supports comprising said bottom side, the upper support being



bent upwardly and horizontally where it meets the lower support so that the structure has an operatively lower surface which lies in a single plane.

4,926,749

ROTARY COMPACTION OF FIBROUS MATERIAL

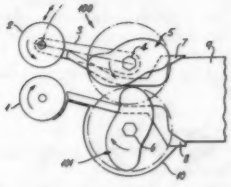
Michael A. Neale, Bedford, and Wilfred E. Klinner, Milton Keynes, both of England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 220,202, Jul. 18, 1988, abandoned. This application Oct. 10, 1989, Ser. No. 418,963

Claims priority, application United Kingdom, Jul. 17, 1987, 8716869

Int. Cl.[5] B30B *5/00, 3/04*

U.S. Cl. 100—177 **13 Claims**



1. A compression device for compressing fibrous material comprising: two double-lobed rotors mounted for rotation on spaced parallel axes, one of said rotors when viewed along its axis of rotation being slightly of an S-shape and having a substantially constant width, except at the end portions thereof, that is at least of the order of one-half of the length thereof and the other of said rotors when similarly viewed along its axis of rotation being a mirror image of said one rotor, said rotors being connected to counter-rotate about said axes with a ninety degree phase difference therebetween said rotors being aligned and opposed and said axes being spaced apart a distance sufficient to enable intermeshing of said rotors while providing a continually varying passageway therebetween having an entrance end and an exit end, whereby during rotation of said rotors to apply periodic pulses of pressure to material within said passageway as the material is fed into said entrance end and passes between said rotors in a direction determined by their senses of rotation.

4,926,750

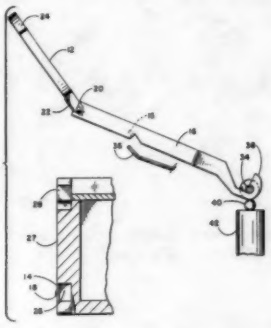
SAFETY LOCKING PULL RING

Peter H. Van Sloun, Hopkins, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 12, 1988, Ser. No. 256,444

Int. Cl.[5] F42C *15/22*

U.S. Cl. 102—261 **12 Claims**



1. Apparatus for a portable munition comprising:

(a) a flexible planar ring having an outward projection, extending in the plane of said ring and in a direction generally perpendicular thereto; the projection having pivot means attached thereto having a pivot axis in the plane of said ring and perpendicular to the projection; said ring being constructed to have a predetermined unstressed shape and a predetermined stressed shape, when compressed along a line perpendicular to the pivot axis in the plane of said ring;

(b) a planar side surface on the munition having a ring recess which can contain said ring, the ring projection, and the pivot means, when said ring is oriented with a predetermined angular orientation with respect to and with the planar surface parallel to the side surface; said recess being sized to contain said ring whether in the stressed or the unstressed shape;

(c) first ring securing means for said ring, when contained within said ring recess, arranged such as to prevent the unstressed shape but permit the stressed shape ring to be rotated out of said ring recess about the pivot axis.

4,926,751

ARRANGEMENT FOR DRAWING A BRAKING PARACHUTE OUT OF AN ARTICLE OF SUBMUNITION

Jurgen Wittman, Nuremburg; Wolfgang von Estress-Fursteneck, Leinburg, and Gunther Thurner, Schwaig, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremburg, Fed. Rep. of Germany

Filed Jun. 26, 1989, Ser. No. 371,592

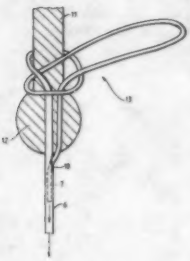
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1988, 3823446

Int. Cl.[5] F72B *10/86*

U.S. Cl. 102—348 **4 Claims**

1. An arrangement for drawing a braking parachute out of a front article of submunition of a pair of submunition articles, including a pull line extending between the front and rear articles of submunition, said pull line having one end fastened to a stowage pack for a braking parachute of the front submunition and having the other end connected through a slip knot with the rear submunition; and a further line being fastened to the braking parachute which engages said slip knot and opens said knot after the drawing of the stowage sack from the para-

chute, said pull line having a hose-like configuration and said further line extending as an internal line through said pull line,



said internalline being conducted outwardly of the pull line in a region proximate the slip knot.

4,926,752

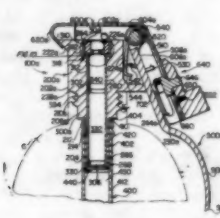
SAFETY FUZE FOR A HAND GRENADE

Vincent DiRubbio, 580 E. Ash St., Perry, Fla. 32347, and Edmund V. Galinski, P.O. Box 860, Andover, N.J. 07821

Filed Mar. 7, 1989, Ser. No. 319,694

Int. Cl.[5] F42B 27/08

U.S. Cl. 102—486 **34 Claims**



1. A fuze for a hand grenade comprising:

(a) a fuze body having a top having a recess therein, a closed bottom, a head adjacent said fuze body top, a stem adjacent said fuze body bottom, and a central portion intermediate said fuze body head and stem, and a bore extending longitudinally through said fuze body, said recess having an opening therein, said opening in said recess defining the top of said bore and said closed of said fuze body defining the bottom of said bore, said head having a pair of opposed front and back walls, a pair of opposed side walls having back edges, and said fuze body central portion including engaging means for engaging the grenade;

(b) a primer positioned in said top of said bore and a delay charge positioned adjacent the bottom of said bore,

(c) detonator assembly means for detonating the hand grenade, said detonator assembly means including a detonator case sealingly engaging the exterior of said fuze body stem and an explosive detonator charge positioned in said detonator case;

(d) an initiator lever assembly mounted on said fuze body and rotatable between an unprimed position and a primed position, comprising:

an initiator lever having a longitudinal plane of symmetry, a distal end and a proximal end and top and bottom surfaces, said initiator lever being rotatable about said proximal end thereof between a first position corresponding to said unprimed position and a second position corresponding to said primed position, said initiator lever being elongated to prevent said initiator lever from being unknowningly released;

mounting means for mounting said proximal end of said initiator lever to said fuze body head adjacent said fuze body top for rotation about an axis perpendicular to said plane of symmetry of said initiator lever between said first position and said second position;

biasing means for biasing said initiator lever in said second position; and

a firing pin mounted on said initiator lever, said firing pin being positioned on said initiator lever to engage said primary when said initiator lever assembly is in said primed position;

(e) a cover assembly comprising a cover piece having a top portion covering said fuze body top and a bottom portion covering said back edges of said side walls, said cover assembly having pin-receiving apertures therein; and

(f) a pull ring assembly having elongated retaining pin means for retaining said initiator lever in said first position thereof when said retaining pin is inserted in said pin-receiving apertures.

27. A fuze for a hand grenade comprising:

(a) a fuze body having a head, a stem, and a central portion intermediate said head and said stem, and a bore extending longitudinally through said head, said central portion, and stem, said central portion including engaging means for engaging the grenade;

(b) a primer positioned in the top of said bore;

(c) detonator assembly means in sealing engagement with the exterior of said stem for detonating the hand grenade;

(d) an initiator lever assembly mounted on said fuze body and rotatable between an unprimed position and a primed position, comprising:

an initiator lever having a longitudinal plane of symmetry, a distal end, and a proximal end, said initiator lever being rotatable about said proximal end thereof between a first position corresponding to said unprimed position and a second position corresponding to said primed position, said initiator lever being elongated to define a handle to be restrained while holding and throwing the grenade;

mounting means for mounting said proximal end of said initiator lever to said fuze body head for rotation about an axis perpendicular to said plane of symmetry of said initiator lever between said first position and said second position;

biasing means for biasing said initiator lever in said second position; and

a firing pin mounted on said initiator lever, said firing pin being positioned on said initiator lever to engage said primer when sad initiator lever assembly is in said primed position;

(e) cover assembly means for protecting said primer and bearing against said initiator lever assembly; and

(f) retaining means for retaining said initiator lever in said first position thereof.

4,926,753

FLEXIBLE MATERIAL TRANSPORT SYSTEM

Mitchell Weiss, Haverford, Pa., assignor to Programmation, Inc., King of Prussia, Pa.

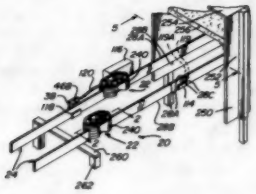
Continuation of Ser. No. 856,992, Apr. 29, 1986, abandoned. This application Sep. 9, 1988, Ser. No. 243,141

Int. Cl.[5] B61J 3/00, 13/04; B60L 11/08

U.S. Cl. 104—88 **45 Claims**

45. A transport system for carrying material to various workstations at spaced-apart locations within a common facility, said transport system comprising a track extending past said workstations and at least one self-powered carrier for support said material thereon, said at least one carrier including a rechargeable battery means for powering it, characterized in that said carrier includes a charging means for the battery means, intelligent controller means for monitoring

information indicative of the condition of the battery means and for providing instructions via signals to said charging



means for controlling charging of said batter means, said intelligent controller means being powered by said battery means.

4,926,754

CABLE WAY FOR SUSPENDED VEHICLES

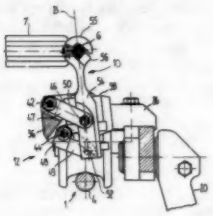
Fritz Feuz, Thun, Switzerland, assignor to Von Roll Transportsysteme AG, Thun, Switzerland

Filed Feb. 10, 1989, Ser. No. 309,348

Claims priority, application Switzerland, Feb. 10, 1988, 00472/88

Int. Cl.[5] B61B *7/02*

U.S. Cl. 104—112 14 Claims



1. Cable haulage apparatus comprising a pulling cable, vehicles, and means for securing said vehicles to said pulling cable, wherein the improvement comprises a guide member (1) defining a course of travel of said vehicles and having a long travel axis (L), said guide member including rigid curved sections, said pulling cable (6) runs along and is spaced from said guide member, said means for securing said vehicle to said pulling cable comprising roller mechanisms (12), each including travel rollers (18) in rolling contact with said guide member along the long travel axis, each said roller mechanism including means for rigidly connecting a grip (10) to said pulling cable in the direction of the long travel axis and for displaceably connecting said grip (10) in a plane extending transversely of the long travel axis, each said grip (10) is pivotally connected to the corresponding roller mechanism (12) by an articulated rocker (34) and includes means for allowing the grip displaceable in said articulated rocker, said grip is connected to said articulated rocker (34) by two link elements (46) for pivotal movement relative to said articulated rocker, and said link elements having spaced parallel axes for effecting pivotal movement of said grip.

4,926,755

RAIL CAR MOVING SYSTEM

Donald S. Selford, Sr., Inver Gr. Hts, Minn., assignor to DS Industrial & Marine Co., Inc., Newport, Minn.

Filed Dec. 27, 1988, Ser. No. 290,138

Int. Cl.[5] B61B *13/12*; B61J *3/06, 3/08*

U.S. Cl. 104—183 9 Claims

1. A rail car moving system which comprises:

a guide track secured onto one end of rail track ties outside of and substantially parallel with supporting rails,

at least one truck supported by wheels and movable relative to said guide track to push a rail car for a desired distance,

said guide track having a configuration conducive to receiving said wheels of said at least one truck,

said at least one truck including two pair of pusher arms,

said pusher arms being adaptable to be recessed in a position lower than a side frame of a rail car and to be raised to an up position which engages said side frame of said rail car for pushing said rail car, and

means for moving said at least one truck for pushing said rail car.

4,926,756

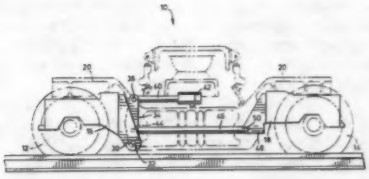
LONGITUDINAL STEERING LINKAGE FOR TRUCK WITH INTERAXLE YOKES

Roy E. Smith, Kingston, and Peter E. Timan, Sydenham, both of Canada, assignors to UTDC Inc., Kingston, Canada

Continuation of Ser. No. 327,375, Mar. 23, 1989, abandoned, which is a continuation of Ser. No. 78,742, Jul. 28, 1987, abandoned. This application Aug. 31, 1989, Ser. No. 407,677

Int. Cl.[5] B61F *3/00*

U.S. Cl. 105—167 4 Claims



1. A steering mechanism for use on a railway vehicle having a car body mounted on at least two trucks, at least one of said trucks having inboard and outboard wheelsets, and a truck frame, each of said wheel-sets having a steering yoke attached thereto, each said steering yoke having a generally C shaped configuration and extending laterally from adjacent one wheel of a wheelset to adjacent the opposite wheel of the wheelset, each said steering yoke further extending inwardly toward the other yoke of said truck and the two side yokes having a pivotal interconnection, said wheelsets supporting said truck and adapted for relative pivotal movement with respect to said truck about a generally vertical axis and,

a steering mechanism for guiding said wheelsets to a radial alignment when said vehicle is travelling on circular curved track, said steering mechanism being independent of any direct pivotal connections to said truck frame, said steering mechanism comprising,

a steering link connected to said car body remote from the longitudinal center line of said car body,

a steering lever pivotally connected to said steering link,

and linkage mechanism interconnecting said steering lever and said inboard and outboard yokes whereby longitudinal movement of the connection between said steering link and said car body with respect to said truck when said truck rotates with respect to said body guides said wheelsets to a radial alignment.

4,926,757

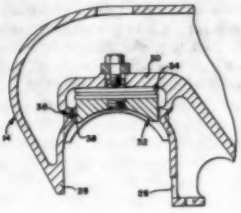
ELECTRICALLY GROUNDED RAILWAY TRUCK

Charles P. Spencer, Staunton, Ill., assignor to Amsted Industries Incorporated, Chicago, Ill.

Filed Jan. 30, 1989, Ser. No. 302,902

Int. Cl.[5] B61F *5/30*

U.S. Cl. 105—224.1 1 Claim



1. An improved railway truck having wheels electrically insulated from side frames by a non-conductive elastomeric suspension pad interposed between said side frame and a wheel-axle bearing adapter, wherein the improvement comprises:

an elastic electrically conductive assembly extending between two spaced opposed surfaces of said side frame and said bearing adapter to form a conductive path between said side frame and said bearing adapter, said conductive assembly comprising a conductive compression spring capable of expanding and contracting sufficiently to keep said spaced opposed surfaces in constant electrical contact throughout relative movement of said side frame and said bearing adapter during operation of said railway truck, said compression spring being seated in an aperture located in one of said spaced opposed surfaces and expanding into contact with the other of said spaced opposed surfaces and being in constant and continuous contact with said side frame and said bearing adapter.

4,926,758

PLAYTRAY WITH HINGED LEGS

Carol E. H. Lilly, Bellevue; Loyd C. Moore, Bellevue; Mark E. Elke, Bellevue, and Nicholas E. Barker, Seattle, all of Wash., assignors to Carol E. H. Lilly, Bellevue, Wash.

Continuation-in-part of Ser. No. 136,117, Dec. 21, 1987, Pat. No. 4,872,410. This application Apr. 25, 1988, Ser. No. 185,737

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.[5] A47B *23/00*

U.S. Cl. 108—43 13 Claims

1. A playtray for use with toys or blocks with at least one attachment surface, comprising:

a table top having first and second end portions and a table play surface with attachment means on said table play surface corresponding to the attachment surface of the toys or blocks for detachably fastening the toys or blocks thereto by their attachment surface;

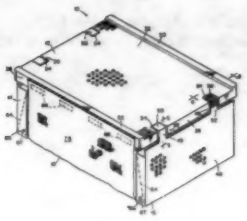
a first leg having a first leg play surface with attachment means on said first leg play surface corresponding to the attachment surface of the toys or blocks for detachably fastening the toys or blocks thereto by their attachment surface;

first hinge means for pivotally attaching said first leg to said table top first end portion;

a second leg having a second leg play surface with attachment means on said second leg play surface corresponding to the attachment surface of the toys or blocks for detachably fastening the toys or blocks thereto by their attachment surface;

second hinge means for pivotally attaching said second leg to said table top second end portion;

first latch means for latching said first leg against movement relative to said table top in at least first and second leg configurations;



second latch means for latching said second leg against movement relative to said table top in at least said first and second leg configurations, wherein in said first leg configuration each said latch means latches the corresponding one of said legs in a position with said first and second legs extending generally transverse to said table top in a common direction to support said table top with said table play surface uppermost, and wherein in said second leg configuration each said latch means latches the corresponding one of said legs in a position with said first and second legs extending away from said table top in generally opposite directions and in a plane generally parallel with said table top to position said table play surface and said first and second leg play surfaces in generally coplanar arrangement to define an extended play surface.

4,926,759

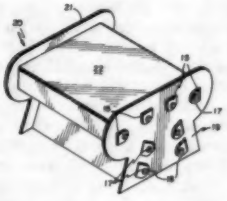
KNOCKDOWN FURNITURE

Sally J. Vitsky, 4116 Bromley La., Richmond, Va. 23221, and Margaret P. Levine-Umans, 13 Bank St., New York, N.Y. 10014

Filed Aug. 31, 1989, Ser. No. 401,421

Int. Cl.[5] A47B *3/00*

U.S. Cl. 108—111 19 Claims



1. Furniture which may be assembled and readily disassembled, comprising:

(a) at least one generally planar central member, having extended from edges thereof a plurality of tab members each having therein an aperture;

(b) at least one generally planar side member, having therethough a plurality of elongated slot-like first apertures for receiving said tab members, and a plurality of adjacent second apertures substantially matching said tab member apertures; and

(c) expansible fastener means for securing said tab members to said side members by inserting said fastener means through said tab apertures and said second apertures.

4,926,760

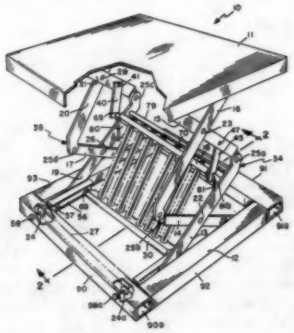
SELF LEVELING TABLES

Allen J. Sack, 3 Township Rd., Waseca, Minn. 56093

Filed Jan. 27, 1989, Ser. No. 302,684

Int. Cl.[5] A47B 9/02

U.S. Cl. 108—145 **11 Claims**



1. A self leveling table having a top for holding stacked articles on the top of the self leveling table comprising:

a table top for holding stacks of articles;

a frame for supporting the self leveling table on a work surface; and

a pair of scissor arms for raising and lowering the table top each of said pair of scissor arms including two foldable members pivotally connected together and each of said pair of scissor arms having a first end for engaging said frame and a second end for engaging said table top, one of said pair of scissor arms including a first pivot member pivotally connected to said table top and a second pivot member pivotally connected to said frame, the other of said pair of scissor arms including a first sliding member slideably connected to said table top and a second slideable member slideably connected to said frame so that said table top can move toward or away from said frame as said pair of scissor arms connecting said table top to said frame are extended or folded;

a plurality of foldable springs having a first end, said first end including means for pivotally mounting said first end on said frame, said plurality of springs having a second end, said plurality of springs including means for pivotally connecting to one of said pair of scissor arms to provide a weight responsive lowering of said table top as more articles are placed on said table top;

means for adjusting a compressive force on said plurality of, adjusting including rotatable bolts having spur gears that are interconnected to each other by a link chain engaging said spur gears;

a cam located on one of said pair of scissor arms; and

a cam follower connected to said plurality of springs, said cam follower engaging said cam to thereby provide a support surface for said plurality of springs as said table top is raised or lowered.

4,926,761

ARMOR PARTICULARLY FOR A SAFE AND A SAFE THUS PRODUCED

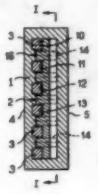
Francis Haesebrouck, Paris la Défense, France, assignor to Usines et Acieries de Sambre et Meuse, Feignies, France

Filed Sep. 9, 1988, Ser. No. 244,515

Claims priority, application France, Sep. 9, 1987, 87 12512

Int. Cl.[5] E06B 9/00; E04B 2/02

U.S. Cl. 109—49.5 **32 Claims**



1. Armor particularly for safes, comprising a weldable refractory steel base plate (1) having two faces, said steel resisting cracking by means of a conventional torch, wherein at least one insert (2, 16, 17, 21, 25, 27*a*, 27*b*) of refractory material resisting an added metal powder torch is encased in the refractory steel (1), the structure and distribution in the interior of the steel of said at least one insert (2, 16, 16, 21, 25, 27*a*, 27*b*) being such that the plate comprises a series of zones, distributed throughout the whole of the plate, which are separated by zones in which the thickness of the steel is different, the plate enclosing moreover at least one insert (3, 18, 22, 26, 28) of drill-resisting material, said inserts being constituted by two series of bars forming a grid embedded in said refractory steel in substantially parallel relationship with the faces of the steel base-plate.

4,926,762

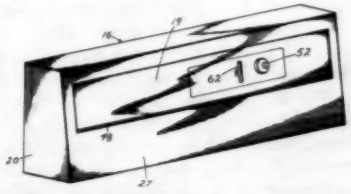
SECURITY SAFES FOR VEHICLES

Clarence A. Paul, P.O. Box 2186, Grass Valley, Calif. 95945

Filed Oct. 10, 1989, Ser. No. 419,500

Int. Cl.[5] E05G 1/04, 3/00

U.S. Cl. 109—51 **20 Claims**



1. A safe for use in a vehicle to secure valuables, comprising:

a metal box-like housing having an interior first layer of heat and fire resistant material placed against said metal; an interior second layer of a fabric carpet-like material over said heat and fire resistant material; a plurality of apertures in at least one panel of said housing adapted to allow attachment of said housing to a stationary member of said vehicle with a plurality of fasteners; said fasteners being of a type to provide nonremovability of said fasteners with said safe in a closed and locked position; an access opening in said housing; a metal reinforcing framework generally interiorly of said housing around said access opening; an openable door structured of a metal panel having a raised reinforcing frame adjacent outside edges of a backside of

said door, said door attached by a hinge to said reinforcing framework of said housing with said hinged door adapted to close said access opening; said hinged door recessed inward of an exposed front edge of said reinforcing framework around said access opening;

a locking means adapted to secure said door over said access opening comprising a combination lock affixed to said backside of said door, said combination lock having a rotary dial accessible on a front side of said door, said combination lock adapted to extend and retract a lock bolt of said combination lock on said backside of said door by way or proper actuation of said rotary dial; a handle rod extending through an aperture in said door generally adjacent said combination lock, a handle attached to one end of said handle rod on said front side of said door adapted to rotate said handle rod with rotation of said handle; a locking plate attached by releasable attachment means to said handle rod on said backside of said door with said locking plate adapted to allow locking said handle rod stationary against an extended said lock bolt of said combination lock; said handle attached to said handle rod by an attachment means adapted to release said handle from said handle rod at a predetermined torque when said handle rod is locked stationary; a main crank connected by attachment means to said handle rod on said backside of said door with said main crank adapted to move with rotation of said handle rod; a main rod attached to said main crank adapted to move with movement of said main crank; said main rod being further attached to at least one secondary crank; said secondary crank rotatably attached to said backside of said door; a plurality of lock pin apertures extending through said raised reinforcing frame in at least two oppositely disposed side edges of said door; a plurality of lock pin apertures in said reinforcing framework around said access opening aligned with said lock pin apertures in said raised reinforcing frame of said door with said door in said closed position; two lock pin rods, one said lock pin rod extending generally parallel along each said oppositely disposed side edge of said door adjacent said reinforcing frame having said lock pin apertures; a plurality of lock pins attached to each said lock pin rod with one said lock pin aligned with each said lock pin aperture in said raised reinforcing frame; a linkage means attached to each said lock pin rod and said secondary crank; said locking means adapted to allow said handle to be manually rotated with said lock bolt retracted whereby said rotation of said handle causes said handle rod and said attached main crank to rotate causing said main rod to move whereby said secondary crank is rotated causing movement of said linkage means; said movement of said linkage means causing both said lock pin rods to move outward extending said lock pins through said lock pin apertures in both said reinforcing frame and said reinforcing framework to lock said safe closed with said rotation of said handle in one direction, said handle rotated in an opposite direction causing retraction of both said lock pin rods and said lock pins to allow opening of said door;

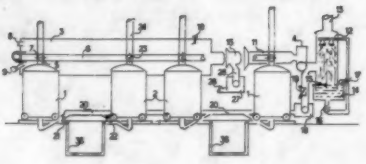
said releasable attachment means attaching said locking plate to said handle rod structured to maintain said locking plate in place and said door in said locked position with said handle and said handle rod removed from said safe.

4,926,763

METHOD AND DEVICE FOR MANUFACTURING CHARCOAL

Andre-Jean Leroux, Brebières, and Claude Mercier, Chemin des Marlieres, 59553 Lambres les Douai, both of France, assignors to Claude Mercier, Lambres les Douai, France, a part interest

Filed Jan. 17, 1989, Ser. No. 297,409
Claims priority, application France, Mar. 1, 1988, 88 02520; Apr. 14, 1988, 88 04928
Int. Cl.[5] F23J *15/00*
U.S. Cl. 110—215 **13 Claims**



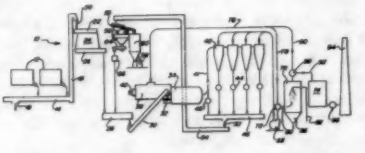
1. Charcoal manufacturing device comprising at least two bottomless furnaces of which, in operation, at least one is in a carbonization phase and at least one other is charged with wet wood to be dried, an incinerator for burning gas produced during the carbonization phase connected to said at least one furnace, a first hot gas diluter connected to said incinerator, an extractor connected to said first diluter, an optional washing device connected to said extractor, means for taking off hot gas produced by said at least one furnace during the carbonization phase upstream of said extractor, said take-off means being connected to said at least one other furnace, and a second hot gas diluter in said take-off means adapted to render the temperature of said hot gas compatible with said wet wood to be dried.

4,926,764

SEWAGE SLUDGE TREATMENT SYSTEM

Jos van den broek, Nijendal 30, 3972 KC Driebergen, Netherlands

Filed Aug. 17, 1989, Ser. No. 394,975
Int. Cl.[5] F23G *5/04*
U.S. Cl. 110—221 **16 Claims**



12. A sewage sludge stream treatment system wherein a concentrated stream of sewage is dried in a rotary drier by a hot gaseous effluent from a combustion chamber, the gaseous discharge from the rotary drier having entrained particulate matter and a high moisture content, the gaseous discharge is further processed sequentially by mechanically separating particulate materials, scrubbing in a wet gas scrubber and heating in an afterburner prior to being vented to the atmosphere wherein the improvement comprises:

a proportional valve means downstream from the rotary drier for directing a portion of the gaseous discharge to an inlet port in the combustion chamber whereby energy requirements of the system are reduced by the use of preheated gases in the combustion chamber and by reducing the volumetric requirements of the afterburner.

4,926,765

FURNACE BLOWER WITH EXTERNAL GAS RECYCLING FOR THE REDUCTION OF NO_x

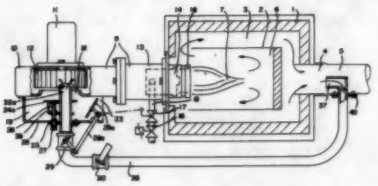
Walter Dreizler, Brachetweg 16, 7000 Stuttgart 75, and Ulrich Dreizler, Verenaweg 3, 7208 Spaichingen, both of Fed. Rep. of Germany

Continuation of Ser. No. 39,072, Apr. 16, 1987, abandoned. This application Apr. 4, 1989, Ser. No. 334,738

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1986, 3642357

Int. Cl.[5] F23B 7/00

U.S. Cl. 110—234 4 Claims



1. In a furnace construction comprising a furnace blower provided with a motor, blower wheel, ventilation housing, portend and a flame tube which is adapted for modulating burner operation with a combined fuel and air control, an air intake chamber attached at a front end of an air intake opening of the ventilation housing, a servomotor-activated air intake control butterfly valve disposed inside the air intake opening of said air intake chamber, a manually adjustable air throttling disk downstream of said air intake opening of the ventilation housing adapted to reduce NO_x by external recycling of exhaust gas through a pipe means characterized in that an exhaust gas recirculation tube is guided through an external wall of air intake chamber and terminates in close proximity to the blower wheel, means to support a flange relative to the exhaust gas recirculation tube for adjustment of an air throttling disk which is movable by means of a threaded spindle, the entrance of exhaust gas recirculation tube being positioned downstream of air throttling disk directly in the low pressure area of blower wheel.

4,926,766

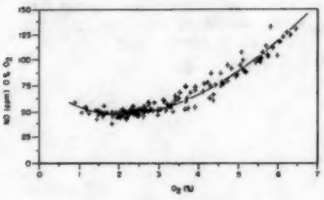
CIRCULATING FLUID BED COMBUSTION WITH CIRCULATING CO COMBUSTION PROMOTER

Amos A. Avidan, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,930

Int. Cl.[5] F23B 7/00

U.S. Cl. 110—342 16 Claims



1. In a circulating fluidized bed combustion zone wherein a carbon-containing material is burned by contact with an oxygen-containing gas in a generally vertical combustor comprising a fast fluidized bed of particulates wherein at least a majority of the particulate matter in the fast fluidized bed has a particle diameter in excess of 100 microns, to generate a flue gas/particulate stream which is discharged from the top of the combustor, said flue gas comprising flue gas, fines having a particle diameter less than about 100 microns, and circulating particles having an average particle size of about 100–400 microns, which flue gas passes through a separation means to recover from the flue gas at least a majority of the 100–400 micron particles which are recycled to the circulating fluidized bed combustion zone, the improvement comprising adding to the circulating particles a circulating CO combustion promoter in an amount equal to 0.001 to 100 wt. ppm of a promoter selected from the group of Pt, Pd, Ir, Rh, Os and compounds and mixtures thereof.

4,926,767

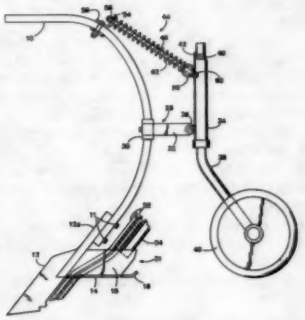
NO-TILL DRILL PROVIDING SEED AND FERTILIZER SEPARATION

J. W. Thomas, HC 11 Box 140, Prescott, Wash. 99348

Filed Oct. 24, 1988, Ser. No. 261,352

Int. Cl.[5] A01C 5/08

U.S. Cl. 111—187 5 Claims



1. A seed and fertilizer drill comprising:

(a) blade means for making a furrow when the drill is pulled across the field;

(b) fertilizer supply tube means positioned adjacent to said blade means for placing fertilizer in the furrow formed by said blade means, proximate the bottom thereof;

(c) seed distribution means associated with said blade means for widening the upper portion of the furrow formed by said blade means above the portion thereof which contains the fertilizer, and for placing seed in the widened furrow portion created thereby in a manner such that it is above the fertilizer and separated therefrom, said seed distribution means including:

(i) a rectangular plate which extends rearwardly from attachment to said blade means and is oriented generally horizontally when the drill is in its operative position;

(ii) said plate having an upturned lip on the end thereof which is opposite the end which is attached to said blade means;

(iii) spaced-apart upstanding side walls which are joined to said plate along the opposed side margins thereof, said side walls extending from joinder with said blade means rearwardly over less than the entire extent of said plate;

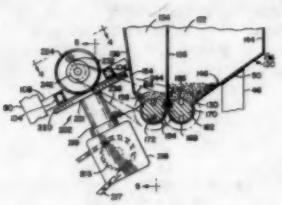
(iv) seed supply tube means for placing seed onto said plate between said side walls; and

(d) a packer wheel which is located behind said blade means and said seed distribution means and closes the furrow formed thereby.

4,926,768
SEED SPREADER

Robert J. Magda, Morganville, N.J., assignor to Lawn Doctor, Inc., Matawan, N.J.

Filed Dec. 11, 1987, Ser. No. 132,000
Int. Cl.[5] A01C *19/02;* **F04B** *17/06*
U.S. Cl. 111—11 **10 Claims**



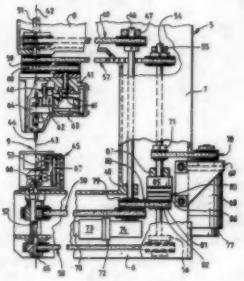
1. A seed spreader, comprising:
a manually guided, power driven, frame assembly having at least one axle;
front wheels operatively connected to said frame assembly;
rear wheels operatively connected to said axle of said frame assembly;
a drive assembly having an internal combustion engine mounted on said frame assembly and operatively connected to said wheels, said drive assembly including a drive sprocket operatively connected to said rear wheels, a drive chain operatively connecting said engine and said drive sprocket, a gear reduction assembly operatively connected to said drive sprocket;
first seed hopper means providing a first compartment mounted on said frame assembly for containing one type of grass seed;
second seed hopper means providing a second compartment mounted on said frame assembly for containing another type of grass seed;
a first seed dispensing tube defining inlet and outlet openings and containing a first set of seed tumblers operatively associated with said first seed hopper means for dispensing one type of grass seed from said first seed hopper means at a first dispensing rate;
a second seed dispensing tube defining inlet and outlet openings and containing a second set of seed tumblers operatively associated with said first seed hopper means for dispensing a second type of grass seed from said second seed hopper means at a second dispensing rate different then said first dispensing rate;
a drive disc operatively connected to and driven by said drive sprocket, said drive disc being positioned at an angle of inclination ranging from about 15 degrees to about 60 degrees and facing generally upwardly and slightly rearwardly;
a first toothless friction wheel engaged and driven by said drive disc for driving said first set of tumblers; and
a second toothless friction wheel engaged and driven by said drive disc for driving said second set of tumblers.

4,926,769
AUTOMATIC SEWING DEVICE WITH A SEWING HEAD INCLUDING A ROTARY HOUSING

Egon Upmeier, Lage-Kachtenhausen, Fed. Rep. of Germany, assignor to Kochs Adler Aktiengesellschaft, Fed. Rep. of Germany

Filed May 31, 1989, Ser. No. 359,874
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1988, 3819975
Int. Cl.[5] D05B *39/00, 69/28*
U.S. Cl. 112—121.12 **9 Claims**

1. An automatic sewing device with a sewing head (5) and a device for generating a two-axis-relative movement between the sewing head (5) and a workpiece (36) to be sewn, said sewing head (5) including:
a rotary housing (41) supported at said sewing head (5) and drivable in a swivelling manner about an axis of rotation by an adjusting shaft (46), said rotary housing (41) having:
a needle bar (44) with a needle (43) supported in said rotary housing (41) and reciprocatingly drivable via a crank drive (62) driven by a common drive, which common drive is drivable by a drive shaft (54) of said sewing head (5), the needle having a needle axis (42) being identical with said axis of rotation,
a needle jogging gear (63, 64) connected to said crank drive (62) for generating a needle feed movement, and

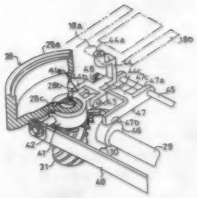


a thread take-up lever drive (40) coupled to said crank drive (62),
a hook bearing (45) drivable in a swivelling manner by said adjusting shaft (46) about said needle axis (42) equiangularly to said rotary housing (41),
a hook (53) arranged in said hook bearing (45) and drivable by said drive shaft (54),
a drive motor (68) for driving said drive shaft (54),
an actuating drive (72) for driving said adjusting shaft (46),
a device for a drive-like connection of the adjusting shaft (46) and the drive shaft (54), and
a device for the disengaging of the drive motor (68) from the drive shaft (54).

4,926,770
NEEDLE HOLE GUIDE MECHANISM FOR ZIGZAG SEWING MACHINE

Susumu Hanyu; Kazumasa Hara, and Yasuro Sano, all of Tokyo, Japan, assignors to Janome Sewing Machine Company Limited, Tokyo, Japan

Filed Jan. 23, 1989, Ser. No. 300,336
Claims priority, application Japan, Jan. 22, 1988, 63-10741
Int. Cl.[5] D05B *3/02, 73/12*
U.S. Cl. 112—453 **3 Claims**



1. A zigzag sewing machine having stitch forming instru-

mentalities including a vertically reciprocating and laterally swingable needle having an upper thread carried thereon, and a loop taker having a lower thread loaded bobbin carried therein and rotatable in a horizontal plane in synchronism with the needle to catch the upper thread and interconnect the upper thread with the lower thread and form lock stitches, the needle being vertically reciprocated by an upper drive shaft rotatably journalled on a machine housing while the loop taker is rotated by a lower shaft operatively connected to the upper drive shaft for rotation therewith, a needle plate having a laterally elongated hole formed therein for receiving the laterally swingable needle, said sewing machine comprising:

(a) needle hole means including a member having formed therein a round needle hole of a diameter slightly larger than that of the needle, the needle hole member being in engagement with the laterally elongated hole of the needle plate and swingable along the latter;

(b) operation means including a base member mounted coaxially with said loop taker and being turnable relative to said loop taker;

(c) means for pivotally connecting said needle hole member to said base member so that said needle hole member may be vertically swingable relative to said base member;

(d) swingable means operatively connected to said needle hole member;

(e) first actuating means including a cam rotated in synchronism with the vertical reciprocation of said needle to swing said swingable means; and

(f) second actuating means including a stepping motor operatively connected to said needle to laterally reciprocate said needle, said stepping motor being also operatively connected to said base member to reciprocate the latter.

4,926,771

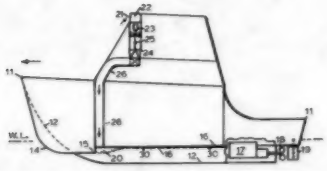
VARIABLE HULL RESISTANCE SYSTEM FOR MARINE VESSELS

Francis R. Hull, 567 E. 26th St., Brooklyn, N.Y. 11210

Filed Jun. 21, 1989, Ser. No. 369,340

Int. Cl.[5] B63B *1/22*

U.S. Cl. 114—61 **5 Claims**



1. A variable water-side flow resistance system to enhance and control forward movement of buoyantly-supported marine vessels comprising an open-channel conduit bounded by lower portions of the vessel's hull, for the passage of fluids thereunder; said open-channel conduit boundaries comprised by a primary hydrodynamic step having bluff trailing surfaces at the after end of a contoured central bow section which is disposed adjacent the forward end of a shallower-draft aft central hull section, said central bow section and said aft central hull section disposed between adjacent elongate outboard hull sponsons whose lower portions project below said primary step of said central bow section and below said aft central hull section; said elongate outboard hull sponsons providing substantial buoyant support for said marine vessel; said aft central hull section having a shingled bottom surface forming a series plurality of secondary hydrodynamic steps with bluff trailing surfaces; means for propelling said marine vessels; and means for selectively supplying ventilation air under said aft central hull section into the water-side separation zone abaft said primary hydrodynamic step to occupy the separation zone and form an air-filled dynamic plenum during planing or semi-planing operations in ahead vessel propulsion, the ventilation air being discharged from the air-filled dynamic plenum to flow downstream adjacent the said series plurality of secondary hydrodynamic steps in the bottom surfaces of said aft central hull section as a thick layer of air bubbles which occupies the separation zones thereof; whereby total water-side pressure drag resistance of the vessel's hull may be substantially reduced when the said ventilation air supply occupies the separation zones of said primary and secondary hydrodnamic steps, and total water-side pressure drag resistance of the vessel's hull may be substantially increased to exert strong braking forces against forward vessel motion when the said ventilation air supply is shut off.

4,926,772

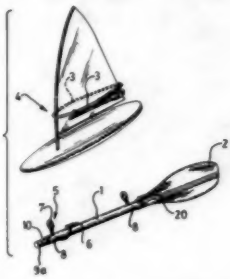
EMERGENCY PADDLE KIT

Vernon G. Bright, 298 Highfield Road, Toronto, Ontario, Canada (M4L 2V5)

Continuation-in-part of Ser. No. 185,725, Apr. 25, 1988, abandoned. This application Sep. 27, 1989, Ser. No. 414,153

Int. Cl.[5] B63H *16/04*

U.S. Cl. 114—39.2 **9 Claims**



1. An emergency paddle kit for a sailboard having a boom, comprising,

a paddle having a shaft with a free end and a blade formed at the opposite end of the shaft;

means positioned on the shaft for releasably attaching the shaft to the boom of the sailboard when the boom is in an operative sailing position,

whereby that when the sail of the sailboard is not being used to propel the sailboard through the water, and the boom is in an inoperative position, said shaft may be released from the boom and the paddle may be used to propel the sailboard.

4,926,773

HIGH PERFORMANCE SEA-GOING CRAFT

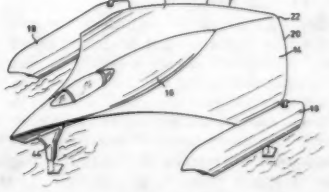
Yehuda Manor, 1 Giladi Street, Jerusalem 93385, Israel

Filed Jun. 9, 1988, Ser. No. 204,300

Claims priority, application United Kingdom, Jun. 12, 1987, 87 13767

Int. Cl.[5] B63B *35/72*

U.S. Cl. 114—61 **8 Claims**



1. A sea-going craft comprising: a main central body,

two wings affixed to said body and extending generally horizontally away therefrom to either side,

a catamaran-type hull affixed to each wing remote from the central body, the hulls being adapted to provide flotation,

each wing having a forward edge and a rearward edge, each rearward edge extending obliquely and smoothly from the respective catamaran-type hull to a rearward location behind the central body, each rearward edge further being substantially closer to the water than the forward edge when the craft is under power, whereby the wings can exhibit the wing-in-ground-effect to produce ram lift,

a hydrofoil affixed to each hull and extending downwardly therefrom, and a third hydrofoil affixed to the central body and extending downwardly therefrom,

and means for propelling the craft.

4,926,774

WIND PROPELLED APPARATUS

William K. Winner, White Salmon, Wash., assignor to Bic Corporation, Milford, Conn.

Filed Dec. 2, 1988, Ser. No. 278,906
Int. Cl.[5] B63B *43/04*
U.S. Cl. 114—123 26 Claims

1. A wind propelled apparatus comprising:

a. body means adapted to support a user;

b. wind-propulsion means adapted to receive wind for motive power; and

c. sleeve means surrounding substantially all of said body means, said surrounding means comprising a stretchable fabric which surrounds and includes an inflatable side pocket positioned on each side of said body means and formed as part of said surrounding means to stabilize the body means with respect to at least one axis, said sleeve means being configured and adapted to be fitted about said body means in relatively snug relation therewith.

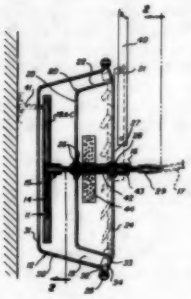
4,926,775

DEVICE FOR CLEANING SURFACES, PARTICULARLY IN WATER

John P. Andorsen, Dehigsardstien 5, 7000 Trondheim, Norway

Filed Apr. 14, 1988, Ser. No. 181,733
Int. Cl.[5] B63B *59/00*
U.S. Cl. 114—222 9 Claims

1. A cleaning apparatus for use under water, particularly for cleaning vertical surfaces which have been fouled by marine organisms, where there is a set of nozzles for spraying water under high pressure against a surface which is to be cleaned and where there is a reaction means which holds the nozzle set in position against the said surface, said nozzle set includes at least one nozzle, the apparatus is characterized by the nozzle set being located on a rotating, disk-shaped holding unit where the rotation axis is generally perpendicular to the surface which is to be cleaned, said set of nozzles also producing a tangential spray component that causes rotation and around the peripheral areas of the rotating holding unit there is a casing which forms an annular chamber with an outlet means



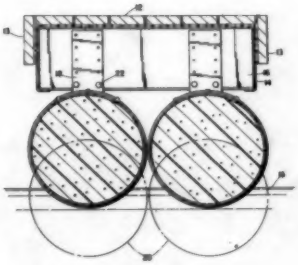
for water which is at least partly directed away from the surface to be cleaned and which forms said reaction means.

4,926,776

VERTICALLY ADJUSTABLE FLOATING DOCK

Reg D. Corbett, 23116 Roberts Run, Bay Village, Ohio 44140

Filed May 15, 1987, Ser. No. 49,830
Int. Cl.[5] B63C *1/02*
U.S. Cl. 114—263 2 Claims



1. A vertically adjustable floating dock unit adapted to float in water and be vertically adjustable relative to the water line, the floating dock unit comprising:

an upper dock structure having an upper dock surface and a downwardly depending transverse frame member, a vertically adjustable mounting assembly, connector means for removably connecting the mounting assembly to the downwardly depending transverse frame member, and a flotation unit secured to the adjustable mounting assembly in spaced relation to transverse frame member whereby the flotation unit is adapt to float in water and support the upper dock structure above the water line;

said mounting assembly comprising an upright member adapted to be removably secured to the downwardly depending transverse frame member and a saddle structure adapted to be secured to and engage an upper surface of the flotation unit;

said vertically adjustable mounting assembly being vertically adjustable relative to the upper dock structure to provide variable height adjustment differentials of the dock surface relative to the water line;

said flotation unit comprises a pair of pontoons and each adjustable mounting assembly includes a saddle member adapted to be secured to one of said pontoons;

each said pontoon is secured to the saddle member by a

strapping means and each said pontoon is substantially cylindrically;

said saddle member contains a stop means adapted to prevent the strapping means from slipping off of the saddle means.

4,926,777

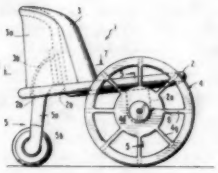
AQUATIC WHEELCHAIR

Frederick B. Davis, Jr., 21 Deer Creek Rd., Ketchum, Id. 83340

Filed Nov. 1, 1988, Ser. No. 265,812

Int. Cl.[5] B63B *35/02;* B63H *16/00*

U.S. Cl. 114—270 20 Claims



1. An aquatic wheelchair comprising, a main flotation body having a seat portion and a backrest portion, a pair of flotation paddle wheels having upper circumference portions, means connecting said pair of paddle wheels underneath said seat portion in proximity to and rearwardly of the front of the seat portion, a flotation stabilizer wheel assembly, means connecting the stabilizer wheel assembly to the backrest portion, said pair of paddle wheels each having a radius positioning the upper circumference portion thereof above said seat portion in a horizontal plane tangent to said circumference portion and intersecting said backrest portion at a medical portion of the height of said backrest portion, and said upper circumference portion positioned rearwardly of the front of said seat portion and forwardly of said backrest portion, whereby an occupant of the chair can grasp the upper circumference portion of the paddle wheels for manually propelling the wheelchair not only on soft terrain but also in the water.

4,926,778

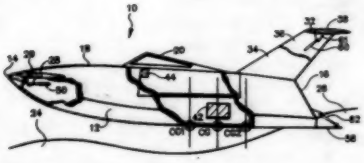
AERODYNAMIC STABILIZATION SYSTEM FOR WATERCRAFT

Daniel D. Johnston, 335 "T" Ave., Coronado, Calif. 92118

Filed Jul. 5, 1988, Ser. No. 216,101

Int. Cl.[5] B63B *1/32, 39/04*

U.S. Cl. 114—273 17 Claims



1. A pitch stabilization system for a high speed planing watercraft comprising in combination:

an elongated planing hull having a bow, a stern, a bottom defining an elongated water contacting planing surface for supporting said hull on the surface of a body of water, and a transverse pitch axis;

variable pitch airfoil means extending outwardly of said hull at the forward end and above the waterline thereof and at a distance from the pitch axis of said hull;

means for sensing a deviation of said hull from a reference pitch angle and generating a signal in response to said deviation; and

control means responsive to said signal for varying said airfoil means for maintaining the pitch of said hull substantially aligned with said reference pitch angle.

4,926,779

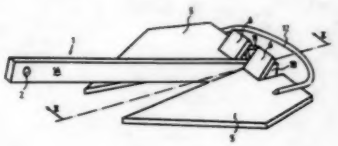
MARINE ANCHOR EQUIPPED WITH ANCHOR WEIGHING MEANS

Claude Piton, and Jacqueline Piton, both of 45, rue de Dinan, 22130 Plancoet, France

Filed Dec. 14, 1988, Ser. No. 284,140

Int. Cl.[5] B63B *21/44*

U.S. Cl. 114—297 6 Claims



1. A marine anchor equipped with anchor weighing means, comprising two symmetrical flukes (5″) joined by transverse shaft (4″), each of said flukes being fitted with a pair of symmetrical ledges (6″) and, a shank (1″) between said flukes (5″), said shank (1″) pivoting around said transverse shaft (4″) that joins the two flukes (5″), so as to form relative to said shaft (4″) a fore arm (1″A) and a rear arm (1″B) carrying transverse stop-pins (13″), characterized in that a truncated triangular aperture (3″) is provided in the shank, the directions of a longitudinal axis perpendicular to the base of said truncated triangle coinciding a longitudinal axis of said shank; for the passage of said shaft (4″) that joins the flukes (5″), the stop-pins coming into abutment against the ledges (6″) of the flukes when the shaft (4″) is in a rear part of the aperture (3″), the stop-pins (13″) being disengaged from said ledges when the shaft (4″) is in a rear part of the aperture (3″), the stop-pins (13″) being disengaged from said ledges when the shaft (4″) is in a fore part of the aperture (3″), a long base of said truncated triangle being located toward the fore part, and elastic or breakable lug pieces for limiting, under normal conditions, the movements of the stop-pins (13″) when the latter are disengaged from said ledges (6″).

4,926,780

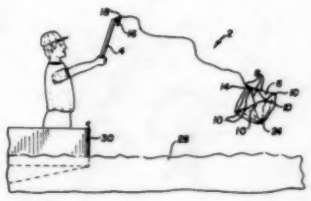
SEA ANCHOR DEPLOYMENT AND STORAGE DEVICE AND ASSOCIATED METHOD

Fred A. Wiehagen, 103 D. Harper Dr., Turtle Creek, Pa. 15145

Filed Jan. 18, 1989, Ser. No. 298,575

Int. Cl.[5] B63B *21/48*

U.S. Cl. 114—311 12 Claims



1. A sea anchor deployment and storage apparatus comprising:

anchor means;

attachment means having a first end and a second end, said anchor means connected to said first end;

spool means connected to said second end of said attachment means, said spool means adapted to store, pay out and retrieve said attachment means; and

elongated tube means having a first end and a second end and defining an interior compartment for storing said anchor means, said spool means being removably attached to said first end of said elongated tube means and said anchor means being deployed from said second end of said elongated tube means.

4,926,781

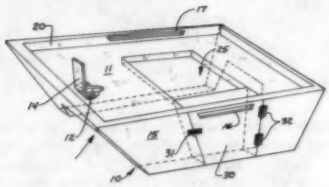
PORTABLE PERSONAL FLOATATION DEVICE

Martin G. Bauer, Rte. 1, Box 1, Bismarck, N. Dak. 58501

Filed Aug. 22, 1988, Ser. No. 234,898

Int. Cl.[5] B63C *9/10*

U.S. Cl. 114—351 **11 Claims**



1. A portable personal flotation device comprising:

a support frame having a main horizontal panel with side panels comprising elongated, longitudinally extending buoyant pontoons attached to the main panel along the sides thereof and extending downwardly from the main panel, the pontoons having front and rear ends and being spaced apart;

an opening in the main panel of use to permit a person to extend through, said opening being defined by the side panels along the sides thereof;

a door formed in a portion of one pontoon, and the door defining one side of the opening in the main panel, the door extending between a top and bottom of the one pontoon and being positioned between the front and rear ends thereof; and

the main panel having sufficient space for the person to sit thereon with legs through the opening.

4,926,782

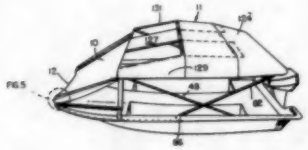
ADJUSTABLE WINDSHIELD AND CANOPY FOR A BOAT

Franklin R. Lacy, 12819 SE. 38th, Suite 57, Bellevue, Wash. 98006

Filed Aug. 26, 1988, Ser. No. 236,596

Int. Cl.[5] B63B *19/02*

U.S. Cl. 114—361 **13 Claims**



1. An adjustable windshield, adapted for use with a boat having a deck, a bow, a stern, and gunwales, the windshield comprising:

a windshield element, having bottom and top edges, which is sufficiently wide to extend substantially across the bow of the boat;

means movably and directly connecting the bottom edge of the windshield element to the deck of the boat in the vicinity of the bow thereof, such that the windshield element moves about the connecting means at the deck of the boat between a first stowed position adjacent the gunwales aft of the connecting means, and a second position angularly removed from the first position;

elongated support means movably connected at one end thereof to the windshield element; and

means connecting the other end of the elongated support means to the boat in such a manner that the said other end is capable of moving longitudinally of the boat a selected distance so that the windshield element may be raised and lowered about the connecting means accordingly.

4,926,783

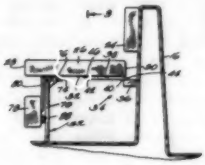
RECREATIONAL BOAT SEAT/SUN DECK

Michael W. Lathers, Metamora, Mich., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jul. 8, 1988, Ser. No. 216,728

Int. Cl.[5] B63B *29/04*

U.S. Cl. 114—363 **27 Claims**



1. A marine vehicle comprising a generally vertical wall, a seat bottom member, and means supporting said seat bottom member for movement between a first position wherein said seat bottom member extends generally horizontally from said wall, and a second position wherein said wall, said supporting means including a mounting member having first and second ends, means connecting said first end of said mounting member to said wall for pivotal movement about a first generally horizontal axis, and means connecting said second end of said mounting member to said seat bottom member for pivotal movement about a second axis generally parallel to said first axis, a retractable leg for supporting said seat bottom member in said first position, and a seat back member mounted on said wall and located between said seat bottom member and said wall when said seat bottom member is in said second position.

4,926,784

PET DEODORIZER DEVICE

Deborah S. Brightful, and Charles E. Brightful, Jr., both of 46 Woodleaf, Pittsford, N.Y. 14534

Filed Jun. 5, 1989, Ser. No. 362,009

Int. Cl.[5] A01K *27/00*

U.S. Cl. 119—106 **1 Claim**

1. A pet deodorizing device comprising, in combination,

a pet collar,

and

an elongate cylindrical canister including a first diameter surface for receiving a cup-shaped lid thereto wherein said lid is hingedly mounted to said canister first diameter surface,

and

a solid chemical member replaceably positioned within said canister,

and

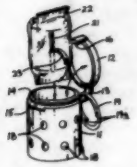
a securement means for securing said canister to said collar, and

wherein said canister includes an annular rim of a second diameter less than said first diameter formed to said canister for receiving the lid, said lid is formed of a diameter equal to said first diameter and is of a cup-shaped configuration to receive said rim therewithin, said rim being of a height substantially equal to a downwardly extending skirt of said lid, and

wherein said lid includes a downwardly extending leg with an inwardly directed tab securable to an outwardly extending flange integrally formed to the canister to selectively latch said lid to said canister, and

wherein said lid is hingedly mounted to said canister including an elongate flexible hinge secured to said canister at the first diameter surface at one end and to the skirt of the lid at its other end, and wherein the leg is secured to said lid diametrically opposed to the hinge, and the flange secured to the first diameter surface diametrically opposed to the hinge, and

wherein the canister is formed with a matrix of through-extending apertures formed through the first diameter



surface to enable distribution of a vapor provided by the chemical member onto an associated animal, and

wherein the chemical member comprises a deodorizing agent, and the chemical member is secured within a hermetically sealed flexible covering, the flexible covering formed with a removable tear strip to enable the vapor to be directed through the covering and through the apertures of the canister, and

wherein securement means includes an annular spring ring slidably mounted onto said elongate flexible hinge securing the lid to the canister and defined by a further diameter less than said first diameter to capture the ring means on the hinge, and

further comprising a collar ring mounted on the collar and the ring means mounted on the collar ring to suspend the canister from the collar, and

wherein said securement means includes an elongate flexible strap orthogonally directed across a rear surface of the canister, and the strap being connected to the canister in alignment with said elongate flexible hinge securing the lid to the canister.

4,926,785

MARKER POST SYSTEM

Frederick W. Lamson, Birmingham, Mich., assignor to Lockwood Manufacturing Co., Livonia, Mich.

Continuation of Ser. No. 229,249, Aug. 8, 1988, abandoned. This application Sep. 19, 1989, Ser. No. 409,280

Int. Cl.[5] E04H *13/00*

U.S. Cl. 116—209 **17 Claims**

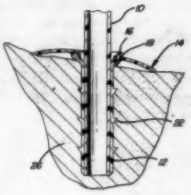
12. A boundary marking system comprising:

a hollow tubular receptacle having a longitudinal axis;

a marker stake, having a longitudinal axis coaxially aligned with the longitudinal axis of the receptacle, removably and contiguously disposed in the receptacle;

a surface plate of substantially greater diameter than the receptacle; and

a swivel means interconnecting the receptacle and surface plate for varying the relative angular relationship between



the surface plate and the respective longitudinal axes of the receptacle and marker stake.

4,926,786

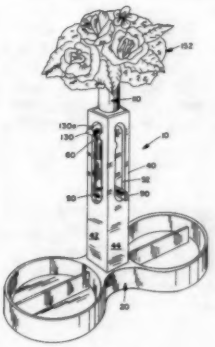
RESTAURANT SIGNALING DEVICE

Thomas C. White, P.O. Box 3208, 10 Lenhardt Ave., Trenton, N.J. 08619

Filed Apr. 10, 1989, Ser. No. 335,372

Int. Cl.[5] G08B *5/02*

U.S. Cl. 116—324 **12 Claims**



1. A restaurant signaling device, comprising:

a base in the form of a tray to be supported on a surface;

an upstanding hollow housing mounted on said base;

a first movable indicator within said housing and movable relative to said housing between a non-signaling and a signaling position to provide a first signal;

a second movable indicator within said housing and movable relative to said housing and relative to said first indicator between a non-signaling and a signaling position to provide a second signal;

said second movable indicator mounted within and movable relative to said first movable indicator; and

means for maintaining said first and second indicators in their respective signaling positions.

4,926,787

ENVELOPE FLAP MOISTENING APPARATUS

Arnold Fassman, Westport, and John R. Nobile, Fairfield, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed May 19, 1989, Ser. No. 354,175

Int. Cl.[5] B05C *1/02*

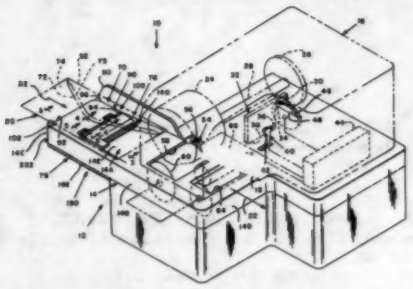
U.S. Cl. 118—32 **15 Claims**

1. Envelope flap moistening apparatus for use in a machine

for feeding an envelope having a flap in a predetermined downstream path of travel, the apparatus comprising:

a. an elongate horizontally-extending stripper blade including a trailing edge longitudinally-extending transverse to the path of travel, the stripper blade including a lower elongate hinge segment and an upper elongate hinge segment, each of the stripper blade hinge segments transversely-extending from the stripper blade trailing edge;

b. an elongate applicator retainer including a leading edge longitudinally-extending transverse to the path of travel,



the retainer including an upper elongate hinge segment and a lower elongate hinge segment, each of the retainer hinge segments transversely-extending from the retainer leading edge;

c. the upper hinge segments and lower hinge segments respectively cooperatively configured for engagement with one another and for maintaining the retainer in a predetermined position of alignment with the stripper blade; and

d. a moisture applicator, the applicator including a pad made of a fluid wicking material for applying moisture to an envelope flap.

4,926,788

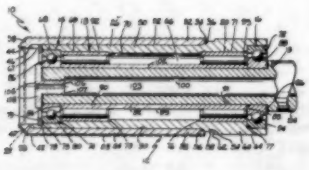
CAN COATER/DECORATOR MANDREL SYSTEM

Robert L. Metcalf, Beaverton, Oreg., assignor to Wilbanks International, Inc., Hillsboro, Oreg.

Filed Jan. 2, 1987, Ser. No. 202

Int. Cl.[5] B05C *13/02*

U.S. Cl. 118—500 **6 Claims**



1. Apparatus for supporting a cylindrical can body workpiece having a cylindrical side wall portion and a bottom wall portion in parallel coaxial relationship to the central axis of a mandrel support shaft of a can decorating machine or the like comprising:

a cylindrical workpiece support sleeve means made of a separately formed one piece solid monolithic body of ceramic material and having an axially central cylindrical bore extending therein with a central longitudinal axis and an elongated cylindrical outer peripheral surface which is concentric to said central longitudinal axis for supporting the cylindrical side wall portion of the workpiece in circumjacent relationship to the support shaft and having an axially innermost end portion and an axially outermost tip portion with a radially inwardly extending interior surface and a radially inwardly extending exterior surface having a profile corresponding to the profile of the bottom wall portion of the workpiece for engaging and supporting the bottom wall portion of the workpiece and having an elongated cylindrical inner peripheral surface which is concentric to said central longitudinal axis;

a support core means made of one piece of metallic material for fixedly supporting said workpiece support sleeve means and having a central cylindrical bore extending therein with a central longitudinal axis which is coaxial with said workpiece support sleeve means for rotatably supporting said workpiece support sleeve means and said support core means in coaxial circumjacent relationship to the support shaft;

said support core means having an elongated cylindrical outer peripheral surface which is concentric to said central longitudinal axis of said support core means and has a length approximately equal to the length of said elongated cylindrical inner peripheral surface of said support sleeve means and has a diameter approximately equal to the diameter of said elongated cylindrical inner peripheral surface of said support sleeve means, and said support core means having an axially outermost end portion with a radially inwardly extending exterior surface having a profile corresponding to the interior surface profile of said tip portion of said support sleeve means for abutting supporting engagement therewith, and said support core member having an axially innermost end portion which is axially inwardly spaced from said axially innermost end portion of said support sleeve means;

at least two axially spaced precision cylindrical bearing support means associated with said support core means for receiving and supporting at least two axially spaced bearing unit means on and in coaxially and concentrically associated relationship with the support shaft; and

interface bonding means for providing a continuous bonded cylindrical surface interface between said cylindrical inner peripheral surface of said workpiece support sleeve means and said cylindrical outer peripheral surface of said support core means and for fixedly permanently connecting said workpiece support sleeve means to said support core means to provide a unitary mandrel assembly.

4,926,789

TRANSPORT APPARATUS FOR BOARDS

Hartmut Wenger, Prattein; Peter Martin, Basel; Hans Rotzinger, Kaiseraugst, and Martin Denz, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 3, 1988, Ser. No. 252,302

Claims priority, application Switzerland, Oct. 13, 1987, 3995/87

Int. Cl.[5] B05C *1/02*; B65G *37/00*

U.S. Cl. 118—668 **18 Claims**

1. A transport apparatus for conveying workpieces in the form of boards comprising advancing means for advancing the workpieces holding elements for the workpieces, gripping means incorporated in each holding element and adapted to grip a workpiece and hold it relative to the holding element, and means releasably coupling a holding element to the advancing means, the advancing means serving to advance the workpiece while engaging only the holding element which holds the workpiece by means of its gripping means, whereby the workpiece can be advanced without coming into direct contact with the advancing means, two holding elements, each incorporating at last one gripper and disposed for engaging

opposite longitudinal edges of said workpiece, a first of said advancing means and a second set of the advancing means, the first set following a fixed path and the second set of advancing means being movable laterally relative to the first, whereby the system can accommodate workpieces of different widths.

4,926,790

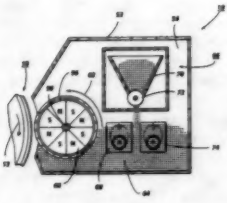
AUGER UNIT

Thomas W. Nash, Sodus, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 22, 1988, Ser. No. 247,566

Int. Cl.[5] G03G *15/09*

U.S. Cl. 118—653 **6 Claims**



1. An apparatus for developing an electrostatic latent image used in a printing machine, including:

a housing defining a chamber having therein a supply of developer material comprising at least carrier granules having toner particles adhering triboelectrically thereto;

means, in communication with the chamber of said housing, for advancing developer material into contact with the electrostatic latent image; and

an elongated member having an elongated aperture therein extending from one end of said member to the other end thereof, said elongated member being positioned at least partially in the supply of developer material in the chamber of said housing and having an expansion chamber connected to the aperture and extending over a portion of the aperture, and

means, disposed in the aperture of said member, for transporting the developer material from one end of the aperture to the other end thereof with at least a portion of the developer material flowing through the expansion chamber for greater mixing thereat to increase the triboelectric charge on the toner particles being transported from one end of the aperture to the other end thereof.

4,926,791

MICROWAVE PLASMA APPARATUS EMPLOYING HELMHOLTZ COILS AND IOFFE BARS

Naoki Hirose; Takashi Inujima, and Toru Takayama, all of Atsugi, Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Filed Apr. 26, 1988, Ser. No. 186,219

Claims priority, application Japan, Apr. 27, 1987, 62-104024; Apr. 27, 1987, 62-104025

Int. Cl.[5] C23C *16/00*

U.S. Cl. 118—723 **5 Claims**

1. A plasma deposition apparatus comprising:

a vacuum chamber in which a deposition space is defined;

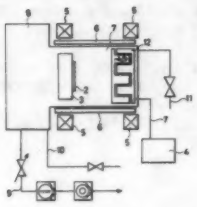
a substrate holder provided in said deposition space for supporting a substrate to be coated;

Helmholtz coils within which said deposition space is located;

Ioffe bars arranged in parallel with the axial direction of said Helmholtz coils;

a vacuum pump for evacuating said vacuum chamber;

a gas feeding means for inputting a reactive gas to said deposition space; and



an energy supplying means for initiating the deposition reaction of said reactive gas.

4,926,792

APPARATUS AND PROCESS FOR COLORING OBJECTS BY PLASMA COATING

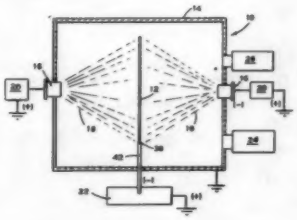
James A. E. Bell, and Bruce R. Conard, both of Oakville, Canada, assignors to Inco Limited, Toronto, Canada

Continuation of Ser. No. 198,189, May 23, 1988, abandoned. This application Aug. 10, 1989, Ser. No. 393,054

Claims priority, application Canada, May 29, 1987, 538430

Int. Cl.[5] B05C *1/02*

U.S. Cl. 118—729 **7 Claims**



1. An apparatus for plasma coating objects, the system comprising a sealable reactor chamber, means for introducing at least one ionic plasma stream into the reactor, an object of storage means disposed within the reactor chamber situated to receive the ionic plasma stream, the improvement comprising the object storage means including four peripheral sides defining a substantially open frame, a plurality of spaced parallel longitudinal races bridging two opposed sides, the longitudinal races adapted to hold the objects and allow rotational and continuous reciprocating translational locomotion of the objects along the length of the races, the length of each longitudinal race being longer than the total length of the objects situated within the longitudinal race, the open frame pivotally mounted on a support disposed within the reactor, and the support adapted to repetitively tilt the open frame through a predetermined arc to effect object locomotion within the races.

4,926,793

METHOD OF FORMING THIN FILM AND APPARATUS THEREFOR

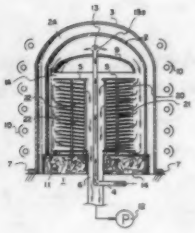
Noboru Arima, Kashiki; Nobuyosi Ogino, Tokyo, and Hiroshi Kimura, Takefu, all of Japan, assignors to Shin-Etsu Handotai Co., Ltd. and Sin-Etsu Quartz Products Co., Ltd., both of Tokyo, Japan

Filed Nov. 30, 1987, Ser. No. 126,784

Claims priority, application Japan, Dec. 15, 1986, 61-296636; Dec. 15, 1986, 61-296637

Int. Cl.[5] C23C 16/00

U.S. Cl. 118—730 9 Claims



1. An apparatus for forming thin films on respective surfaces of a plurality of substrates, said apparatus comprising a vertical reactor defining a reaction space and having a vertical axis, an exhausting means provided along said reactor axis, a plurality of substrate supporters arranged in a peripheral space around said exhausting means and spaced a predetermined radial distance from said exhausting means, each of said substrate supporters carrying a set of vertically stacked substrates spaced a predetermined distance from each other, and means for passing reaction gas substantially vertically along an inner wall surface of said reactor situated radially outward of said substrate supporters, so that said reaction gas passes through reaction regions on the surfaces of individual substrates and then is discharged directly out of said reactor through said exhausting means.

4,926,794

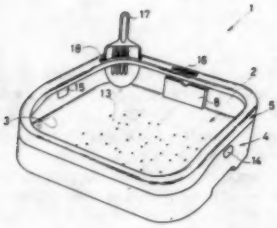
DOMESTIC PETS' CHAMBERPOT

Yoshikazu Yamamoto, 1-1, 3-chome, Egasosho, Habikino-shi, Osaka, Japan

Filed Mar. 28, 1989, Ser. No. 329,657

Int. Cl.[5] A01K 29/00

U.S. Cl. 119—1 2 Claims



1. An animal toilet comprising:

a base structure having a level horizontal bottom surface and four substantially vertical peripheral walls extending upwardly from said bottom surface, one of said peripheral walls having a shorter height than the other peripheral walls;

a removable guard device mounted on top of said peripheral walls opposite said bottom surface, said guard device having four outer wall portions corresponding to and fitted to said peripheral walls and inwardly directed jaw portions extending from said outer wall portions and overhanging an area above said bottom surface so as to prevent material held within said base structure from being thrown out of said animal toilet;

engaging bores extending through at least two of said peripheral walls and disposed toward the top thereof, said at least two peripheral walls located opposite each other;

engaging projections extending from at least two of said outer wall portions corresponding to said engaging bores in said at least two peripheral walls away from said jaw portions, said engaging projections having dimensions so as to engage within and extend through said engaging bores to a position outside of said area above said bottom surface presenting a substantially flush surface with said at least two peripheral walls so that said guard device is locked to said base structure when said engaging projections are engaged within said engaging bores and said guard device is unlocked from said base structure when, by the application of manual pressure directed against said engaging projections inwardly toward said area above said bottom surface, said engaging projections are moved out of said engaging bores and the guard device is thereby removed from said base structure; and

a holder means for receiving a deodorizer/aromatic agent on an inner surface of one of said peripheral walls, said guard device further having an opening in the jaw portion thereof such that when said guard device is locked to said base structure, the opening is disposed above said holder means so as to permit the deodorizer/aromatic agent to exit therethrough.

4,926,795

METHOD OF REINSTATING ACCEPTABLE FLAVOR TO OFF-FLAVOR CATFISH BY TREATMENT WITH PEROXIDE ADDITIVES

Frank S. Hamilton, Schlater; Johnny D. Ouzts, Cleveland, and Ray W. Mabry, Greenwood, all of Miss., assignors to HOM, Inc., Greenwood, Miss.

Filed Feb. 14, 1989, Ser. No. 309,869

Int. Cl.[5] A01K 61/00

U.S. Cl. 119—3 7 Claims

7. A method of achieving commercially acceptable flavor reinstatement in non-scaly fish raised in an aquatic environment and intended to be marketed commercially, said fish having been determined to have a commercially unacceptable off-flavor comprising:

subjecting said off-flavor fish in said aquatic environment to an effective amount of an inorganic peroxide which releases hydrogen peroxide into said aquatic environment for a time sufficient to reinstate commercially acceptable flavor.

4,926,796

GROOMING DEVICE

Arthur B. Leopold, Secaucus, N.J., assignor to Tarel Seven Design, Inc., Secaucus, N.J.

Continuation of Ser. No. 172,707, Mar. 24, 1988, Pat. No. 4,807,569, which is a continuation of Ser. No. 934,201, Dec. 18, 1986, Pat. No. 4,747,371. This application Nov. 7, 1988, Ser. No. 268,005

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.[5] A01K 13/00

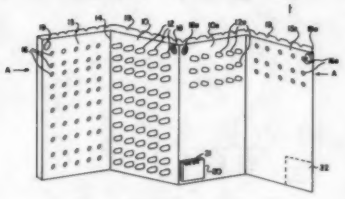
U.S. Cl. 119—83 6 Claims

1. An animal grooming device, comprising:

plate means made of a material selected from a group consisting essential of plastic, rubber and a combination thereof, said plate means defining an area at which said plate means can be folded, said plate means including a

pair of surface portions each having a plurality of teeth extending therefrom and each surface portion spaced apart from each other by said area;

means for securing said plate to a support; and



container means coupled to said plate for storing an aromatic substance for attracting the animal to said grooming device, wherein said container means has a surface with a plurality of holes therethrough for emitting the aroma of the aromatic substance when the aromatic substance is contained therein.

4,926,797

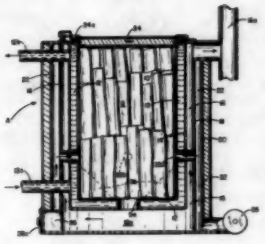
WOOD BURNING HOT WATER FURNACE

Jon E. Butler, 6447 N. 48th St., St. Paul, Minn. 55109

Filed Feb. 21, 1989, Ser. No. 312,686

Int. Cl.[5] F22B *5/00*

U.S. Cl. 122—15 **3 Claims**



1. A forced air liquid heating furnace comprising,

a combustion chamber, having side walls, a bottom and a removable top closure,

a liquid heating chamber surrounding portions of the combustion chamber in heat exchange relation thereto,

an exhaust gas plenum below the combustion chamber,

an exhaust gas discharge passage in the bottom of the combustion chamber delivering the combustion gases downwardly into the plenum,

an annular exhaust gas passage surrounding the liquid heating chamber and receiving the exhaust gases from the plenum,

a vent stack communicating with the upper end of the annular exhaust gas passage to discharge the exhaust gases from the combustion chamber into the atmosphere, and

a blower delivering combustion air into the lower portion of the combustion chamber to produce an air flow downwardly within said chamber through the bottom exhaust gas passage in the bottom of the chamber, and wherein the liquid heating chamber underlies the bottom of the combustion chamber in heat exchange relation to both the plenum and the combustion chamber.

4,926,798

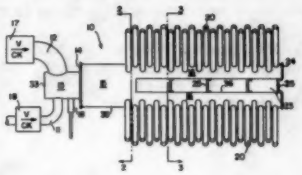
PROCESS FOR PULSE COMBUSTION

Peter Kardos, Longmeadow, Mass., assignor to Gas Research Institute, Chicago, Ill.

Continuation-in-part of Ser. No. 229,130, Aug. 5, 1988, Pat. No. 4,884,963. This application Jul. 26, 1989, Ser. No. 383,671

Int. Cl.[5] F22B *31/00*

U.S. Cl. 122—24 **15 Claims**



1. A process for pulse combustion in a horizontal pulse combustor having fuel inlet valve means, air inlet valve means, a combustion chamber, and a plurality of downstream combustion chamber branches in which each is in communication with a plurality of downstream exhaust tubes, the process comprising the steps of:

introducing air through the air inlet valve means and into a mixing and ignition chamber;

introducing fuel through the fuel inlet valve means and into the mixing and ignition chamber;

forming a combustible fuel/air mixture within the mixing and ignition chamber;

igniting the fuel/air mixture to begin combustion within the mixing and ignition chamber;

exhausting combustion product gases through the combustion chamber branches and further through the exhaust tubes.

4,926,799

CONTINUOUS FLOW STEAM GENERATOR

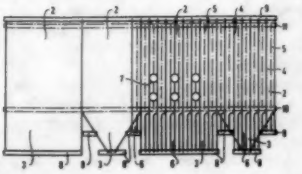
Eberhard Wittchow, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jul. 26, 1989, Ser. No. 385,740

Claims priority, application European Pat. Off., Jul. 26, 1988, 88112051.3; Jun. 26, 1989, 89111630.3

Int. Cl.[5] F22B *15/00, 25/00, 37/10*

U.S. Cl. 122—235 A **8 Claims**



1. Continuous flow steam generator, comprising a vertical gas flue having means for attaching burners for fossil fuel, a tube wall, and a lower end with a bottom, said tube wall including vertically disposed tubes with inlet and outlet ends and long sides being welded together in a gas-tight manner, said bottom including other tubes having inlet and outlet ends and being welded together in a gas-tight manner, said tubes of said tube wall including tubes of a first tube group and tubes of a second tube group, said tubes of said first tube group being hydraulically connected to said other tubes of said bottom and having an outlet header connected to said tubes of said first tube group, said tubes of said second tube group having an inlet header and an outlet header connected to said tubes of said second tube group, a conduit connected between said outlet

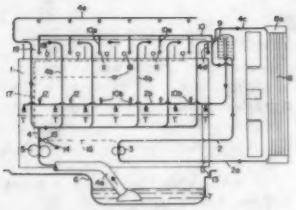
header of said first tube group and said inlet header of said second tube group for hydraulically connecting said tubes of said second tube group downstream of said tubes of said first tube group, and said inlet end of each tube of said first tube group merging with said outlet end of at least one of said other tubes of said bottom.

4,926,800

OIL-COOLED INTERNAL COMBUSTION ENGINE

Assen Valev, Perchtoldsdorf, Austria, assignor to Steyr-Daimler-Puch, Vienna, Austria

Filed Apr. 12, 1989, Ser. No. 336,749
Claims priority, application Austria, Apr. 29, 1988, 1103/88
Int. Cl.[5] F01P *3/02*
U.S. Cl. 123—41.42 **16 Claims**



1. An internal combustion engine, having portions subject to high temperatures and other portions to be cooled, comprising an oil pan containing an oil sump,

a cooling oil circuit, directly connected to said oil sump, containing a cooling oil pump and extending to said other portions to be cooled,

a lubricating oil circuit, connected to said cooling oil circuit, and containing an oil cooler, a lubricating oil pump and an oil filter, and

secondary cooling oil circuit means, branching from said lubricating oil circuit downstream of said oil cooler, and extending to said portions subject to high temperatures.

4,926,801

WET/DRY CYLINDER LINER FOR HIGH OUTPUT ENGINES

Eugene Eisenberg, Hagerstown, Md.; Frederick E. Lindsay, Greencastle, Pa.; James J. Evans, Titusville, Fla., and Ronald H. Collins, Waynesboro, Pa., assignors to Mack Trucks, Inc., Allentown, Pa.

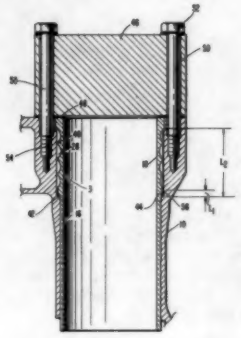
Filed Dec. 22, 1987, Ser. No. 136,400
Int. Cl.[5] F02F *1/10*
U.S. Cl. 123—41.84 **5 Claims**

1. In an internal combustion engine comprising a cylinder head and a plurality of cylinders each of which includes a cylinder wall and cylinder bore, a cooling arrangement for the engine comprising:

(a) a cylinder liner having a predetermined length and being received in each of said bores, a lower portion of each liner being a dry portion of said liner which is received in a corresponding bore with an interference fit along the substantial length of the lower portion under operating conditions, said lower portion constituting approximately two-third of the length of said liner and providing support for said liner;

(b) an upper portion of said liner being disposed at a combustion region of the cylinder and being formed to provide a plurality of passages for liquid coolant extending in substantially parallel arcuate paths around the cylinder liner, said arcuate paths comprise means for increasing velocity of said liquid coolant around said combustion region said passages being of substantially constant cross-section so as to provide substantially uniform high velocity circulation of liquid coolant around the cylinder liner in said combustion region, the upper portion of the liner constituting approximately one-third of the length of said liner and being a wet portion of the liner with the liquid coolant being in contact with said upper portion of the liner so as to provide the entire cooling for said cylinder liner;

(c) a shoulder formed on said liner approximately at a junc-



tion of said upper and lower portions and a shoulder formed on said cylinder wall; and

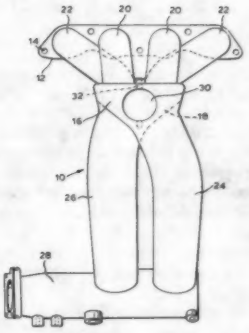
(d) means engaging said cylinder wall for pressing said shoulders in firm engagement so that the engaged shoulders at approximately the junction of said upper and lower portions provide a seal which prevents liquid coolant from contacting the dry lower portion of the cylinder liner.

4,926,802

TUNED MANIFOLD

Guy D. Morris, Rettendon Commos; Trevor A. Jordon, Hullbridge; William C. Davidson, Woodham Ferrers, and Timothy J. Bowman, Bexley, all of England, assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 16, 1988, Ser. No. 285,158
Int. Cl.[5] F02M *9/10*
U.S. Cl. 123—52 M **5 Claims**



1. A manifold for a bank of multiple cylinders of an engine having a number of pairs of primary tracts, each primary tract leading to a respective cylinder and a pair of secondary tracts each connected at a respective one of two separate branching points to a respective pair of pimary tracts which lead to cylinders of which the combustion cycles are in antiphase, wherein the two branching points are arranged adjacent one another

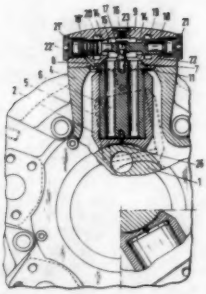
and form between a decoupling chamber within which there is disposed a valve connecting the two branching points, characterized in that the secondary tracts cross over at their ends near the primary tracts such that the branching points are contiguous and disposed one above the other, and in that all the primary tracts are of equal length.

4,926,803

RADIAL-PISTON ENGINE

Mattias Szewczyk, and Hans-Jürgen Pöting, both of Witten, Fed. Rep. of Germany, assignors to Paul Pleiger Maschinenfabrik GmbH & Co. KG, Fed. Rep. of Germany

Filed Nov. 29, 1988, Ser. No. 277,287
Int. Cl.[5] F01B *1/06*
U.S. Cl. 123—55 R **8 Claims**



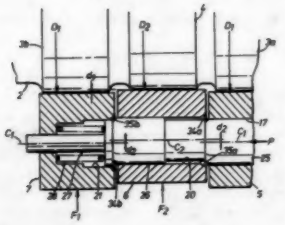
1. A radial-piston engine having radially extending cylinders and a housing with respective cylinder covers and having pot-shaped pistons which are in contact with the circumference of an eccentric shaft and into which there engages in each piston a guide body mounted radially beyond the piston to the respective cylinder cover in floating arrangement, and having fluid ports in the cylinder cover for the inflow and outflow of a pressure fluid, wherein a control element (15), connected in jointed manner to the guide body (5), is adjustably disposed in the housing for controlling the inflow and outflow ports (19, 20).

4,926,804

MECHANISM FOR SWITCHING VALVE OPERATING MODES IN AN INTERNAL COMBUSTION ENGINE

Koichi Fukuo, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 23, 1989, Ser. No. 356,915
Claims priority, application Japan, May 23, 1988, 63-125437
Int. Cl.[5] F01L *1/34*
U.S. Cl. 123—90.16 **9 Claims**



1. In a mechanism for switching valve operation modes in an internal combustion engine having high- and low-speed cams with different cam profiles corresponding to rotational speed ranges of the engine, a valve disposed in an intake or exhaust port of a combustion chamber and normally urged to be closed by spring means, a directly moving transmitting member for imparting a lift of said low-speed cam to said valve, an idling transmitting member for transmitting a lift of said high-speed cam to said valve, and selective coupling means for selectively connecting both said transmitting members when mutually adjacent portions of both the transmitting members are in a predetermined positional relationship, an improvement comprising,

The diameter of a base-circle portion of said high-speed cam being smaller than the diameter of a base-circle portion of said low-speed cam.

4,926,805

PUSH ROD TUBE FOR HIGH LIFT ROCKER ARMS

Robert A. Tomlinson, 28813 Farmersville, Farmersville, Calif. 93223

Filed Apr. 12, 1989, Ser. No. 336,699
Int. Cl.[5] F01L *1/14*
U.S. Cl. 123—90.61 **1 Claim**

1. A push rod tube for a flat four opposed cylinder air cooled engine comprising

an elongated tube having a fluted outer end with straight sides tapering down to an intermediate location along the length of the tube, said tube having an increased internal diameter for a portion of the length thereof in the fluted portion with the largest portion of the diameter being disposed at the outer end of said tube,

a flange disposed proximate the outer end of said tube in surrounding relation, and

said elongated tube having an inner end opposite said fluted outer end with an accordion section disposed proximate said inner end.

4,926,806

TWO-FLUID FUEL INJECTED ENGINES

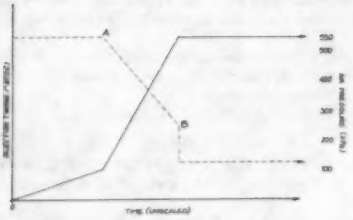
Steven R. Ahern, Claremont; Roy S. Brooks, and Martin J. P. Cebis, both of South Perth, all of Australia, assignors to Orbital Engine Co., Proprietary Limited, Balcatta, Australia

Filed Feb. 23, 1989, Ser. No. 313,831
Claims priority, application Australia, Feb. 25, 1988, P16956
Int. Cl.[5] F02M *67/02*; F02D *41/06*
U.S. Cl. 123—179 L **21 Claims**

1. A method of controlling the injection of fuel directly into the combustion chamber of an engine comprising injecting a metered quantity of fuel into the combustion chamber by a charge of gas at an above atmospheric pressure, and controlling the timing of said injection of the fuel in relation to the combustion chamber cycle whereby:

(1) the timing of injection fuel when the engine is idling is preset,

(2) at the commencement of start up of the engine, the timing of injection is adjusted so injection occurs at a preselected timing earlier in the combustion chamber cycle than said preset timing of injection for idle,



(3) in response to the engine reaching a predetermined speed of rotation during start up, the timing of injection is progressively adjusted each engine cycle towards said preset injection timing at idle during a time interval of between about 0.2 to 1.0 seconds commencing from the engine attaining said predetermined speed, and

(4) thereafter adjusts the timing of injection in accordance with the engine speed and/or load.

4,926,807

IGNITION SIGNAL DISTRIBUTING CIRCUIT FOR ENGINE

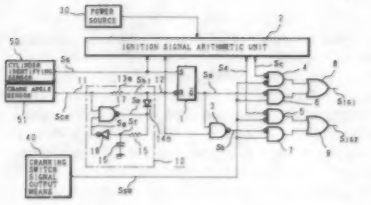
Takanori Fujimoto, and Toshirou Hara, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 24, 1989, Ser. No. 356,165

Claims priority, application Japan, Jun. 3, 1988, 63-137996

Int. Cl.[5] F02P 9/00

U.S. Cl. 123—179 BG **4 Claims**



1. An ignition signal distributing circuit for a multicylinder engine comprising:

a power source for power supplying;

a cylinder identifying sensor which identifies that a predetermined cylinder is to be ignited and outputs a signal in response to a detected result;

a means for outputting an engine starting information when said engine is started up;

a crank angle sensor which detects a predetermined crank angle and outputs a signal in response to the detected crank signal;

a flip-flop which is inputted output signals of said both sensors;

an arithmetic circuit which distributes ignition signals to every cylinder of said engine individually on the basis of output signals of said both sensors, the output of said flip-flop and said engine starting information; ;and

a delay circuit which delays the output signal of said crank angle sensor for the duration from the starting of power supplying by said power source to a completion of the first output signal of said crank angle sensor.

4,926,808

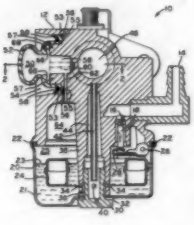
PRIMER BULB CHECK VALVE SYSTEM FOR AN INTERNALLY VENTED BOWL PRIMER CARBURETOR

William C. Kandler, New Holstein, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Jun. 8, 1989, Ser. No. 363,627

Int. Cl.[5] F02M 1/16

U.S. Cl. 123—187.5 R **15 Claims**



1. A carburetor for providing a fuel/air mixture to an internal combustion engine, said carburetor comprising:

a carburetor body having a throat formed therein, said throat defining a fuel/air mixture passage through said body,

a fuel supply bowl,

conduit means for conveying fuel from said fuel supply bowl to said throat,

a variable volume primer chamber,

a priming passageway from said chamber to said fuel supply bowl,

operator actuable primer means for abruptly varying the volume of said primer chamber and displacing a discrete volume of air from said chamber through said priming passageway into said fuel supply bowl,

a venting passageway extending from said throat to said chamber, and

valve means associated with said primer chamber for blocking the flow of air from the primer chamber through said venting passageway when the primer means is actuated to displace air through said priming passageway into said fuel supply bowl.

4,926,809

INTERNAL COMBUSTION ENGINE WITH ROTARY VALVE

Charles A. Allen, 55 Hidden Springs Rd., Spartanburg, S.C. 29302

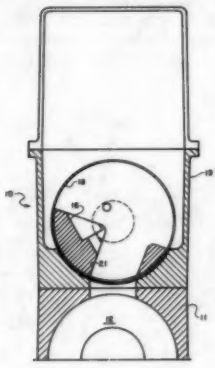
Filed Aug. 10, 1989, Ser. No. 392,068

Int. Cl.[5] F01L 7/00

U.S. Cl. 123—190 A **7 Claims**

1. In an internal combustion engine having a cylinder, a piston moving within the cylinder, an intake manifold through which air flows into the cylinder, inlet valve means for controlling the flow of air into the cylinder, and fuel control means for controlling the flow of fuel into the cylinder with the air, an improvement in said inlet valve means and comprising an elongate thin wall right circular cylindrical valve member mounted for rotation within said intake manifold about the longitudinal axis of said valve member and having an arcuate flow opening therethrough extending over an arc of at least about 100 degrees measured on the circumference of a circle

described by the intersection of said valve member with a plane perpendicular to said axis, and means for driving said



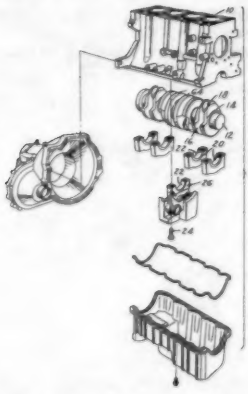
valve member in rotation in timed relation to movement of said piston within said cylinder.

4,926,810

ENGINE VIBRATION BALANCER

Roy E. Diehl, Northville, and Alvin H. Berger, Brownstone, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 5, 1988, Ser. No. 253,474
Int. Cl.[5] F02B *75/06*
U.S. Cl. 123—192 B **4 Claims**



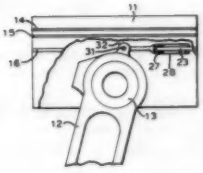
1. A crankshaft vibration balancing means for an automotive type internal combustion engine, comprising, in combination, an engine block having main bearing means, a crankshaft rotatably mounted in the bearing means, and at least one main bearing cap securing the bearing means and crankshaft to the block, and a desmodromic operating type vibration balancing mass pivotally secured to and supported upon the cap and mounted for an oscillatory movement with respect to the axis of the crankshaft to balance the second order of vibration of the crankshaft at a selected frequency of rotation thereof, and cam means on the crankshaft engagable with and oscillating the mass upon rotation of the crankshaft, the mass consisting of a pair of elements each essentially L-shaped in cross-section with a central pivot fulcrum and two leg portions extending from the pivot forming essentially a right angle with respect to each other, means securing the elements to the bearing cap on opposite axial sides thereon, the elements being arranged oppositely on the cap in a face-to-face relationship whereby the resultant center of mass of both elements lies on the vertical axis of the bearing cap and crankshaft and cam means, the cam follower means being mounted adjacent the ends of each leg portion and equidistant from the fulcrum.

4,926,811

INTERNAL COMBUSTION ENGINES

Bryan N. V. Parsons, Stoney Stanton, United Kingdom, assignor to Jaguar Cars Limited, United Kingdom

Filed Jun. 30, 1989, Ser. No. 375,147
Claims priority, application United Kingdom, Jul. 6, 1988, 8816092
Int. Cl.[5] F02F *5/00*
U.S. Cl. 123—193 P **9 Claims**



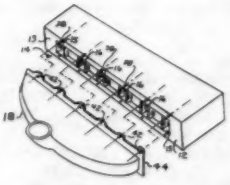
1. An internal combustion engine comprising a cylinder, a piston mounted for reciprocating motion within the cylinder and sealed with respect thereto, the piston being connected to a crankshaft by means of a connecting rod which is pivotally attached at opposite ends to the piston and to the crankshaft, an oil ring being provided in a circumferential groove in the wall of the piston, said oil ring being split so that there will be a gap in the ring when it engages the wall of the cylinder and means being provided to reduce the width of the gap, upon upward movement of the piston.

4,926,812

CYLINDER HEAD INTAKE MANIFOLD INTERFACE

Fred L. Culley, Batavia, Ill., assignor to Navistar International Transportation Corp., Chicago, Ill.

Filed Nov. 2, 1989, Ser. No. 431,046
Int. Cl.[5] F02F *1/24*
U.S. Cl. 123—193 H **14 Claims**



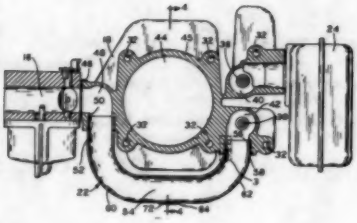
1. In an internal combustion engine cylinder head, said cylinder head having an intake manifold interface surface intersected by charge air intake port inlets having port walls, the improvement comprising arcuate columnar structures disposed laterally adjacent the intake port inlets thereof and having a periphery smoothly blended into the port walls to provide arcuate port inlets and a depressed chamber disposed between said columnar structures between adjacent port inlets, said depressed chamber being recessed into said cylinder head from the outermost periphery of said columnar structures.

4,926,813

INVERTED PORT ENGINE WITH CROSS-UNDER INTAKE PASSAGE

Kevin G. Bonde, Kiel, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Jul. 12, 1989, Ser. No. 378,808
Int. Cl.[5] F02M *35/10*
U.S. Cl. 123—195 HC **16 Claims**



1. In a vertical shaft internal combustion engine having a carburetor and an exhaust system, a cylinder assembly comprising:

a cylinder block comprising a cylinder including a a piston bore, an intake cavity for receipt of an intake valve, an exhaust cavity for receipt of an exhaust valve, said exhaust cavity having an exhaust port therein, said exhaust cavity located proximate and have said intake cavity on a first side of said cylinder, a downwardly facing first opening located below said intake cavity on said first side, a downwardly facing second opening located on a second side, and a carburetor port located on said second side, said first opening being in communication with and near said intake cavity, said second opening being in communication with said carburetor port;

a cross-under tube connected to said cylinder block, said cross-under tube having a first end and a second end received in said cylinder block, said cross-under tube being U-shaped with said first and second ends being relatively parallel, said first end and said second end of said cross-under tube being slidably received in said first opening and said second opening, respectively, of said cylinder; and

means for connecting and sealing said cross-under tube to said cylinder block such that said cross-uner tube and said cylinder block provide an intake passage from said carburetor port to said intake cavity;

said carburetor disposed on said second side and connected to said carburetor port, said exhaust system being disposed on said first side and connected to said exhaust port.

4,926,814

CRANKCASE BREATHER AND LUBRICATION OIL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Kevin G. Bonde, Kiel, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

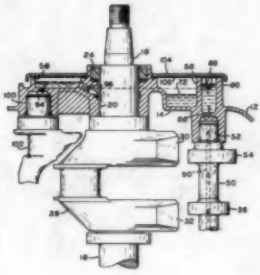
Filed Jul. 12, 1989, Ser. No. 378,867
Int. Cl.[5] F01M *1/00*
U.S. Cl. 123—196 W **16 Claims**

1. In an internal combustion engine including a crankcase having a generally horizontally oiented top wall, an oil sump, an oil pump, and a vertically oriented crankshaft rotatably journalled therein, a horizontally oriented cylinder bore communicating with and extending from the crankcase, a piston disposed for reciprocation within the cylinder bore and linked to the crankshaft, and a plurality of lubrication sites, the improvement comprising:

a first upstanding wall extending upwardly from the top wall of said crankcase, said first upstanding wall circumscribing and defining a first chamber;

breather passage means for communicating crankcase gases from said crankcase into said first chamber;

drain passage means for communicating oil separated from the crankcase gases in said first chamber into the cylinder bore below the piston, said drain passage means being positioned along the cylinder bore so as to be periodically occluded by the piston during reciprocation thereof;



a second upstanding wall extending upwardly from the top wall of said crankcase in spaced relationship to at least a portion of said first wall, said first and second walls defining therebetween a second chamber;

first oil passage means communicating oil from said lubricant pump to said second chamber; and

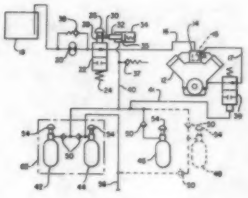
second oil passage means communicating oil from said second chamber to at least one of the lubrication sites.

4,926,815

RAPID SHUT-OFF SYSTEM FOR TRUCK ENGINE

Trent E. Cowley, Wright, Wyo., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 6, 1989, Ser. No. 403,633
Int. Cl.[5] F02B *77/08*
U.S. Cl. 123—198 DB **9 Claims**



1. An engine shut-off system particularly adapted for use in conjunction with a propulsion engine for an off-highway vehicle such as a large dumper truck and the like, said system comprising:

a supply conduit for supplying fuel to said engine and in communication with a source of fluid fuel;

fuel flow shut-off valve means interposed in said conduit, said shut-off valve means being normally biased to a closed position and being actuated to an open position by valve actuating means;

actuator means operable to be engaged with said valve actuating means and a source of pressure fluid for placing said shut-off valve means in an operating condition which will rapidly close said shut-off valve means; and

a source of pressure fluid disposed for operation from at least one of an operator's cab for said vehicle and a position in proximity to the ground surface and exterior of said vehi-

cle for operation of said actuator means to cause said shut-off valve means to shut off fuel flow to said engine.

4,926,816

ROTARY PISTON ENGINE

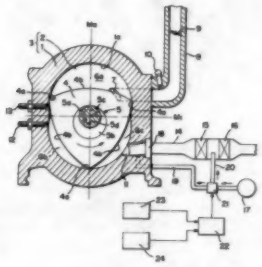
Tatsuya Kita; Takuro Shigemura; Setsuo Nakamura, all of Hiroshima, and Hisanori Nakane, Higashihiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Dec. 19, 1988, Ser. No. 285,982

Claims priority, application Japan, Dec. 21, 1987, 62-192658[U]

Int. Cl.[5] F01N *3/32*; F02B *53/00*

U.S. Cl. 123—203 **18 Claims**



1. A rotary piston engine comprising a casing including a rotor housing having an inner wall of a trochoidal configuration and a pair of side housings gas-tightly secured to the opposite sides of the rotor housing to form a rotor cavity therein, a substantially polygonal rotor disposed in said casing with apex portions in sliding contact with the inner wall of the rotor housing to define working chambers of which the volumes cyclically change to conduct intake, compression, expansion and exhaust strokes as the rotor rotates, an intake port provided in said casing to communicate with the working chamber in the intake stroke, an exhaust port provided in said casing to communicate with the working chamber in the exhaust stroke, air supplying means for supplying air comprising an air pump and an air supplying passage connecting said air pump and said exhaust port, an insert comprising a hollow body located in said exhaust port, an exhaust port passage provided in the hollow body with its inner end located in the trailing part of said exhaust port and an air injection passage provided in the hollow body with its inner end located in the leading part of said exhaust port, said air injection passage being connected with said air supplying passage, nozzle means being located at the inner end of said air injection passage for discharging air into the leading side of the working chamber which is in the exhaust stroke.

4,926,817

COMBUSTION CHAMBER OF SUBCHAMBER TYPE INTERNAL COMBUSTION ENGINE

Koji Imoto; Tadao Omura; Yoichi Katsoka, all of Nagasaki; Kunihiko Nakajima, Muko; Motoyuki Maekawa, Kyoto; Hiroki Tamura, Okazaki, and Yoshiaki Shioya, Kyoto, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Mitsubishi Jidosha Kogyo Kabushiki Kaisha, both of Tokyo, Japan

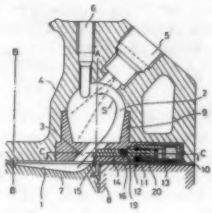
Filed Dec. 27, 1988, Ser. No. 290,191

Claims priority, application Japan, Dec. 24, 1987, 62-325219

Int. Cl.[5] F02B *19/02, 19/18*

U.S. Cl. 123—292 **12 Claims**

1. In a fuel-injected combustion engine having a cylinder head in which a subchamber is defined, fuel injection means for injecting fuel into said subchamber, and a main combustion chamber, the improvement comprising a mouthpiece having an inner peripheral surface defining a subchamber injection port open to the subchamber and to the combustion chamber, and the mouthpiece having a space defined therein open to said peripheral surface; a subchamber injection port control rod disposed in said space adjacent said subchamber injection port; and an actuator disposed in said space remote from said subchamber injection port with said subchamber injection port control rod interposed therebetween, said actuator operatively engaging said subchamber injection port control rod for positioning one end of said control rod at the location at which said space is open to said inner peripheral surface when the engine is subjected to a light load and for projecting said control rod



into said subchamber injection port passageway to reduce the cross-sectional area thereof when the engine is subjected to a heavy load that is greater than said light load, said actuator comprising a working substance such as wax or rubber or alcohol that expands and contracts to a significant degree when subjected to temperature changes, and an expansible member comprising an expansible material such as rubber sealing said working substance within said actuator and conformed to receive the other end of said control rod, said other end of said control rod extending in and engaged by said expansible member.

4,926,818

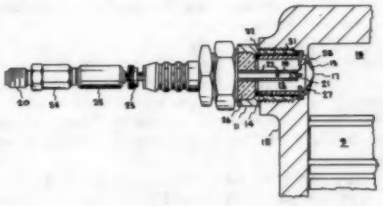
PULSED JET COMBUSTION GENERATOR FOR PREMIXED CHARGE ENGINES

A. K. Oppenheim, Berkeley; H. E. Stewart, Alameda, and K. Hom, Hercules, all of Calif., assignors to The Regents of the University of California, Oakland, Calif.

Filed Feb. 24, 1989, Ser. No. 315,405

Int. Cl.[5] F02P *1/00*; F02B *23/00*

U.S. Cl. 123—297 **12 Claims**



1. Apparatus for generating pulsed jets comprising combustion initiating high temperature combustion products containing an appreciable amount of active radicals, for injection into compressed premixed fuel-air charges of internal combustion engines during an appropriate time interval close to the end of the compression stroke, for initiating and controlling combustion of said compressed premixed fuel-air mixture, which comprises:

a body defining an interior chamber, said chamber including a terminal section defining at least one orifice for forming

said jet, said body being capable of being secured to said internal combustion engine in fluid communication with the head space of a cylinder of said engine to direct said jet into said head space;

a hollow electrically conductive tube secured to said body in electrically insulated relationship thereto, one first end of said hollow electrode projecting into said interior chamber, said first end being closed and defining a plurality of spray perforations between the interior of said tube and said chamber, said hollow, electrically conductive tube having a second end capable of being connected to a supply of pressurized fuel in an electrically non-conductive relationship with said body, and said hollow, electrically conductive tube being capable of being connected to source of electrical energy sufficient to cause an electrical discharge across said chamber for ignition.

4,926,819

SYSTEM FOR INJECTING FUEL INTO COMBUSTION CHAMBERS OF AN INTERNAL COMBUSTION ENGINE

Gerhard Auwärter, Stuttgart; Ernst Imhof, Münchingen; Iwan Komaroff, Regensburg; Helmut Reum; Günther Schmid, both of Stuttgart, and Bernhard Kaczynski, Waiblingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

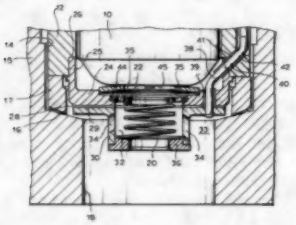
PCT No. PCT/DE87/00008, § 371 Date Sep. 14, 1988, § 102(e) Date Sep. 14, 1988, PCT Pub. No. WO87/05663, PCT Pub. Date Sep. 24, 1987

PCT Filed Jan. 10, 1987, Ser. No. 271,755

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1986, 3609749

Int. Cl.[5] F02M *53/06*; F02B *9/08*

U.S. Cl. 123—297 **10 Claims**



1. A system for injecting fuel into the combustion chambers of an internal combustion engine comprising, in combination:

a nozzle body having a front side;

a glow coil having two ends;

a sleeve enclosing said glow coil at a radial distance therefrom, said sleeve having at least one aeration opening leading into the annular space between said sleeve and said glow coil allowing air to enter the boundary zones of the injection jets from said combustion chamber by means of injector action;

a contact ring body for mounting said glow coil and said sleeve downstream from said front side of said nozzle body, one end of said glow coil making contact with and being supported at said sleeve and the other end of said glow coil being in electrical connection with said contact ring body;

means for electrically insulating said sleeve from said contact ring body;

an axially springing heat protection ring interposed between said contact ring body and said front side of said nozzle body; and

a current lead extending along said nozzle body and making electrical connection with said sleeve, the arrangement being such that said sleeve and said contact ring body provide a conductive path for carrying current through said glow coil from said current lead.

4,926,820

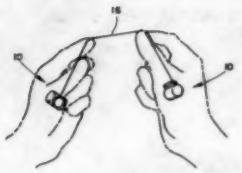
DENTAL FLOSS HOLDING ASSEMBLY

E. Stafford Wearn, P.O. Box 1746, Statesville, N.C. 28677

Filed Mar. 31, 1989, Ser. No. 331,499

Int. Cl.[5] A61C *15/00*

U.S. Cl. 132—323 **8 Claims**



1. A dental floss holding assembly comprising a pair of holders, one each for being held in a hand while dental floss suspended under tension therebetween is manipulated in dental interstices, each of said pair of holders comprising:

(a) a compact, hand-holdable substantially cylindrical member having a size for being held in and completely enclosed within the palm of the hand;

(b) said hand-holdable member having positioned on the cylinder wall intermediate the ends an outwardly-extending disk defining a floss-retaining groove between said hand-holdable member and said disk for securing one wrapped end of said length of floss therearound, said disk having a diameter approximately one-half the length of the hand-holdable member.

4,926,821

ELECTRONIC CONTROLLER FOR INTERNAL COMBUSTION ENGINES

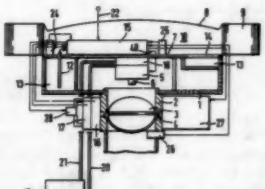
Wolfgang Porth, Frankfurt am Main; Wolfgang Weibler; Eckhart Kern, both of Hofheim a. T.; Thomas Hannewald, Griesheim, and Reiner Weingärtner, Hofheim a. T., all of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 926,454, Nov. 3, 1986, Pat. No. 4,719,891. This application Dec. 21, 1987, Ser. No. 135,658

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1985, 3539012

Int. Cl.[5] F02D *41/00*

U.S. Cl. 123—399 **11 Claims**



1. In a system having an electronic controller for an internal combustion engine, in which the controller is functionally connected to a plurality of sensors and at least one actuator, the improvement comprising:

an assembly including the controller; and wherein

the assembly comprises a throttle-valve mechanism, an air-mass sensor and a throttle-valve position sensor;

said electronic controller comprises a controller of an electronic gas-pedal system;

said throttle-valve mechanism comprises an electromotive actuator, and said electronic controller includes an output connected to said electromotive actuator; and

the system further comprises an injection valve located within a housing, said injection valve serving as said actuator and being driven by the controller;

an air filter assembly which has a circular air filter and is located on an outer wall of the housing; and wherein

a flow channel formed in said housing connects an inner space of the filter assembly, formed by the circular air filter, to the inside of the housing, said air-mass sensor being located within said flow channel; and

the electronic controller is located on the outer wall of the housing and extends into the inside of the air-filter assembly.

4,926,822

CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE

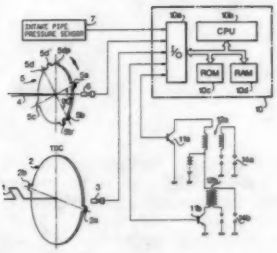
Kunihiro Abe, and Masaaki Furuyama, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 14, 1989, Ser. No. 338,731

Claims priority, application Japan, Apr. 28, 1988, 63-108673

Int. Cl.[5] F02D 7/067

U.S. Cl. 123—414 **4 Claims**



1. A system for controlling an internal combustion engine having even cylinders, comprising:

a crankshaft disk rotated in synchronism with a crankshaft of said engine;

at least two first indicator means formed on said crankshaft disk on diametrically opposite positions, corresponding to specific positions in crank angle;

a first sensor for sensing said first indicator means and for producing a crank angle signal;

a camshaft disk rotated in synchronism with a camshaft of said engine;

at least two second indicator means formed on said camshaft disk on diametrically opposite positions, corresponding to specific positions in cam angle for at least two groups in which a pair of cylinders are in opposite phase to each other;

a second sensor for sensing said second indicator means and for producing a cam angle signal;

third indicator means formed on said camshaft disk for representing a specific cylinder;

discriminator means responsive to an output signal of said second sensor when detecting said third indicator means for producing a discriminating signal;

control means responsive to said crank angle signal and to said cam angle signal for controlling operations for the cylinder in each group, and responsive to said discriminating signal, said cam angle signal and said crank angle signal for independently controlling the operation for each cylinder.

4,926,823

METHOD OF CONTROLLING AN AIR/FUEL RATIO OR AN INTERNAL COMBUSTION ENGINE

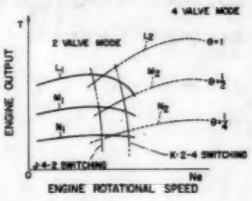
Noriyuki Kishi; Atsushi Katoh, both of Tokyo, and Tomohisa Saita, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 12, 1987, Ser. No. 119,657

Claims priority, application Japan, Nov. 12, 1986, 61-269335

Int. Cl.[5] F02B 15/00

U.S. Cl. 123—432 **17 Claims**



1. A method of controlling an air/fuel ratio for an internal combustion engine having a valve switching device for changing the characteristics of an intake valve operation as a function of at least an engine rotational speed, comprising the step of:

gradually varying the air/fuel ratio according to at least a change in said engine rotational speed in a range of rotational speeds including when said valve switching device effects valve switching operation, wherein said valve switching device operates to open only one valve at low engine speeds and to open all intake valves at high engine speeds.

4,926,824

FUEL INJECTION SYSTEM

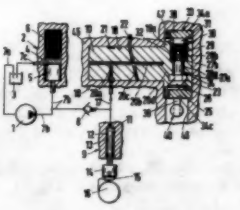
Gerd-Uwe Dahlmann, Wolfsburg, Fed. Rep. of Germany, assignor to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany

Filed May 10, 1989, Ser. No. 349,995

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816089

Int. Cl.[5] F02M 39/00

U.S. Cl. 123—450 **6 Claims**



1. A fuel injection system comprising a device for proportioning and distributing fuel to the individual cylinders of an internal combustion engine including a pressure pump having a high-pressure chamber, a distribution rotor driven in proportion to the speed of the engine and having high-pressure channels communicating with the high-pressure chamber of the pressure pump for variable connection with injection lines leading to the cylinders of the engine, a control valve in the distribution rotor connecting the highpressure channels therein with an outlet to control the end of fuel injection and actuable by a roller tappet disposed in a transverse bore of the distribution rotor, and a plurality of camlike projections surrounding

the distribution rotor and engageable by the roller tappet which are displaceable in the peripheral direction.

4,926,825

AIR-FUEL RATIO FEEDBACK CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

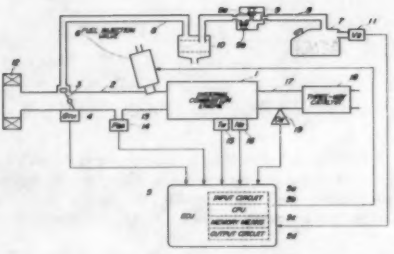
Shoichi Ohtaka, and Hisashi Igarashi, both of Wako, Japan, assignors to Honda Giken Kogyo K.K. (Honda Motor Co., Ltd. in English), Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 278,024

Claims priority, application Japan, Dec. 7, 1987, 62-310314; Dec. 7, 1987, 62-310315

Int. Cl.[5] F02M 25/08; F02D 41/14

U.S. Cl. 123—489 13 Claims



1. In a method of controlling in a feedback manner the air-fuel ratio of an air-fuel mixture being supplied to an internal combustion engine having an intake system, a fuel supply system, means for supplying vaporized fuel from said fuel supply system to said intake system during operation of said engine, an exhaust system, and sensor means arranged in said exhaust system for sensing the concentration of an exhaust gas ingredient therein, wherein during operation of said engine in an air-fuel ratio feedback control region, the air-fuel ratio is controlled by the use of a correction value which varies in response to an output from said sensor means and the maximum or minimum value of which is limited to an upper or lower limit value,

the improvement comprising the steps of sensing the pressure of said vaporized fuel in said fuel supply system, and setting at least one of said upper and lower limit values in accordance with the sensed pressure of said vaporized fuel.

4,926,826

ELECTRIC AIR-FUEL RATIO CONTROL APPARATUS FOR USE IN INTERNAL COMBUSTION ENGINE

Shimpei Nakaniwa, and Toshifumi Itoh, both of Isesaki, Japan, assignors to Japan Electronic Control Systems Co., Ltd., Gunma, Japan

Filed Aug. 25, 1988, Ser. No. 236,223

Claims priority, application Japan, Aug. 31, 1987, 62-215191; Sep. 11, 1987, 62-226607

Int. Cl.[5] F02M 51/00

U.S. Cl. 123—489 23 Claims

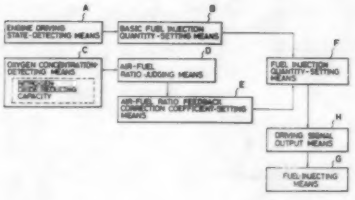
1. An electric air-fuel ratio control apparatus for use in an internal combustion engine, which comprises:

an engine driving state-detecting means for detecting the driving state of the engine;

a basic fuel injection quantity-setting means for setting a basic fuel injection quantity based on the engine driving state detected by the engine driving state-detecting means;

an oxygen concentration-detecting means for detecting an oxygen concentration in an exhaust gas, which has such an output characteristic that the output value gradually changes with the oxygen concentration in a zone in the vicinity of the theoretical air-fuel ratio of an air-fuel mixture sucked in the engine, wherein said oxygen concentration-detecting means comprises a zirconia tube having platinum electrodes formed on an inner surface and an outer surface thereof, in which an electromotive force is generated according to the oxygen concentration ratio between outer air introduced in the interior of the zirconia tube and exhaust gas from the engine outside the tube, said platinum catalyst layer acting as an oxidation catalyst with such a weakened oxidation activity that the output electromotive force of the oxygen concentration-detecting means is gradually changed with an air-fuel ratio in a zone in the vicinity of the theoretical air-fuel ratio, said oxygen concentration-detecting means having a capacity for reducing nitrogen oxides contained in an exhaust gas of the engine, detects the concentration of oxygen in the exhaust gas, inclusive of oxygen obtained by reduction of the nitrogen oxides, and has such an output characteristic that the output value gradually changes with the oxygen in a zone in the vicinity of the theoretical air-fuel ratio of an air-fuel mixture sucked in the engine;

an air-fuel ratio-judging means for comparing the output value of the oxygen concentration-detecting means with a



predetermined value corresponding to the theoretical air-fuel ratio and judging the air-fuel ratio of the air-fuel mixture sucked in the engine with reference to the theoretical air-fuel ratio;

an air-fuel ratio feedback correction coefficient-setting means for changing and setting, by integration control based on a predetermined integration constant, an air-fuel ratio feedback correction coefficient for correcting the basic fuel injection quantity based on the result of the judgment of the air-fuel ratio-judging means to bring the actual air-fuel ratio close to the theoretical air-fuel ratio;

a fuel injection quantity-setting means for setting a fuel injection quantity based on the basic fuel injection quantity set by the basic fuel injection quantity-setting means and the air-fuel ratio feedback correction coefficient set by the air-fuel ratio feedback correction coefficient-setting means;

a fuel injection means for injecting fuel into the engine; and

a driving signal output means for putting out a driving signal corresponding to the fuel injection quantity set by the fuel injection quantity-setting means to a fuel-injecting means in an on-off manner.

4,926,827

OUTPUT CORRECTION METHOD FOR EXHAUST GAS INGREDIENT-CONCENTRATION SENSORS

Akira Kato, and Toru Yano, both of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Apr. 14, 1989, Ser. No. 338,987

Claims priority, application Japan, Jun. 30, 1988, 63-162856

Int. Cl.[5] F02D 41/14

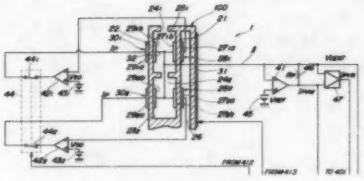
U.S. Cl. 123—489 11 Claims

1. In an output correction method for an exhaust gas ingredient-concentration sensor adapted for use in an internal combustion engine, said sensor having first and second sensor elements having output characteristics different from each other, said

first and second sensor elements each producing an output proportional to the concentration of an ingredient in exhaust gases emitted from said engine, wherein said sensor controls the air-fuel ratio of a mixture supplied to said engine to a desired air-fuel ratio by the use of an output from at least one of said first and second sensor elements,

the improvement comprising the steps of:

(1) determining whether or not a difference between said



desired air-fuel ratio and an actual air-fuel ratio represented by said output of at least one of said first and second sensor elements is smaller than a predetermined value, and

(2) correcting an output value of one of said first and second sensor elements based on an output value of the other of said first and second sensor elements when it is determined that said difference is smaller than said predetermined value.

4,926,828

AIR-FUEL RATIO FEEDBACK CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

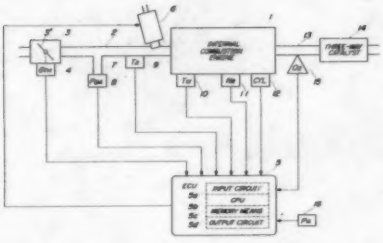
Sachito Fujimoto, and Shuichi Hosoi, both of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Feb. 14, 1989, Ser. No. 310,869

Claims priority, application Japan, Mar. 1, 1988, 63-49182

Int. Cl.[5] F02D *41/14*

U.S. Cl. 123—489 **3 Claims**



1. A method of effecting feedback control of the air-fuel ratio of an air-fuel mixture being supplied to an internal combustion engine having an exhaust system, and a sensor arranged in said exhaust system for sensing a value of the concentration of an ingredient in exhaust gases from said engine, wherein when said engine is operating in a feedback control region, the value of the concentration of said ingredient detected by said sensor is compared with a reference value, and the air-fuel ratio of the air-fuel mixture is controlled to a desired value in a feedback manner responsive to the result of the comparison, the method comprising the steps of:

(1) detecting a value of atmospheric pressure; and

(2) setting said reference value to a value depending on the detected value of atmospheric pressure, said reference value being set to different values between when said engine is operating in an idling region within said feedback control region and when said engine is operating in a region within said feedback control region other than said idling region.

4,926,829

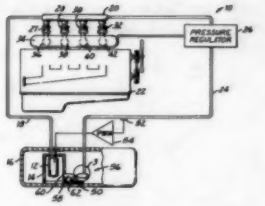
PRESSURE-RESPONSIVE FUEL DELIVERY SYSTEM

Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Continuation-in-part of Ser. No. 276,801, Nov. 28, 1988. This application Mar. 17, 1989, Ser. No. 324,649

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—497 **9 Claims**



1. A fuel delivery system for an internal combustion engine that includes a fuel supply with a pump responsive to application of electrical power for delivering fuel under pressure, an engine air intake manifold, fuel delivery means coupled to said fuel supply for controlled delivery of fuel from said supply to said manifold, pressure regulator means having a first input responsive to fuel pressure at said fuel delivery means, a reference input connected to said air intake manifold and an outlet connected through a fuel return to said supply, said regulator means being responsive to a predetermined pressure differentials across said fuel delivery means for passing excess fuel through said return to said supply, and means for applying electrical power to said pump; characterized in that said power-applying means comprises:

means in said return between said regulating means and said supply for restricting flow of fuel therethrough and thereby developing a back pressure of fuel in said return between said restricting means and said regulator means, a differential pressure sensor having a first input coupled to said return between said restricting means and said regulator means, a second input connected to receive air at ambient pressure and an output for supplying an electrical sensor signal as a direct continuous function of a differential between said back pressure and ambient caused by fuel flow through said return, and means for applying electrical power to said pump as a continuous inverse function of said sensor signal.

4,926,830

MOUNTED FUEL TANK HEATER

Jerald R. McNelley, Rte. 2, Box 172, Benton, Tenn. 37307

Filed Feb. 3, 1989, Ser. No. 306,641

Int. Cl.[5] F02M *53/00, 31/16;* F02N *17/02*

U.S. Cl. 123—557 **6 Claims**

1. A system for preheating fuel for an internal combustion engine having a fuel line comprising:

a fuel tank for storing fuel to be supplied to said fuel line, said tank having an access opening provided in an upper portion thereof;

an elongated heat exchanger installed through and secured to said access opening, a substantial portion of said heat exchanger being contained within said fuel tank;

said heat exchanger defining an inlet port and an outlet port proximate a first end portion of said heat exchanger positioned externally of said fuel tank;

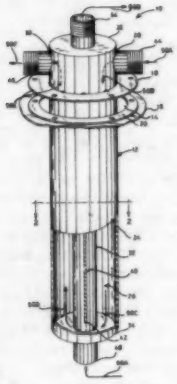
a heated fluid chamber defined by said heat exchanger communicating between said inlet and outlet ports, said heated

fluid chamber including a divider plate which separates said heated fluid chamber into an inlet section communicating with said inlet port and an outlet section communicating with said outlet port, said divider plate being positioned such that a heated fluid entering said inlet port flows toward a second end portion of said heat exchanger where said heated fluid flows through said outlet section of said heated fluid chamber and exists through said outlet port;

a source of said heated fluid;

means for providing fluid communication between said source of heated fluid and said inlet and outlet ports of said heat exchanger;

said heat exchanger further comprising a fuel tube passing substantially axially through said heated fluid chamber



and forming a portion of said divider plate, said fuel tube having a fuel inlet end positioned externally of said heated fluid chamber proximate said second end portion of said heat exchanger in fluid communication with said fuel in said fuel tank, and said fuel tube having a fuel outlet end positioned externally of said heated fluid chamber proximate said first end portion of said heat exchanger in fluid communication with said fuel line of said internal combustion engine;

whereby said fuel in said fuel tank is heated by heat transferred from heated fluid contained within said heated fluid chamber through the walls of said heat exchanger; and

whereby fuel drawn from said fuel tank through said fuel tube into said fuel line is further heated by heat transferred from heated fluid contained by said heated fluid chamber which surrounds said fuel tube.

4,926,831

FUEL VAPORIZATION APPARATUS

Gregory K. Earl, 4005 Saul Rd., Kensington, Md. 20895

Filed May 12, 1989, Ser. No. 350,845

Int. Cl.[5] F02M *31/18*

U.S. Cl. 123—557 **33 Claims**

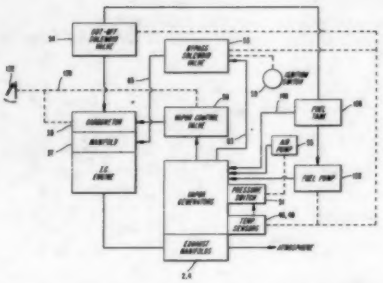
1. A vaporization apparatus for use in the fuel supply system of an internal combustion engine, comprising:

vapor generator means for generating fuel vapor;

fuel inlet means for introducing fuel into said vapor generator means in a mist form;

exhaust collection means, connected adjacent said vapor generator means, for collecting heated exhaust from said internal combustion engine and providing heat to said vapor generator means; and

valve means, connected to said vapor generator means, for selectively providing said fuel vapor to a carburetion device of said internal combustion engine;



said vapor generator means comprising first and second vapor generator chambers and a vapor passage element connected between and in vapor communication with said first and second vapor generator chambers.

4,926,832

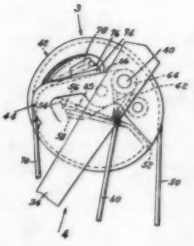
COMPOUND BOW WITH ADJUSTABLE CABLE LENGTH

Rex F. Darlington, 3540 Darton Rd., Hale, Mich. 48739

Filed Feb. 28, 1989, Ser. No. 316,773

Int. Cl.[5] F41B *5/00*

U.S. Cl. 124—25.6 **2 Claims**

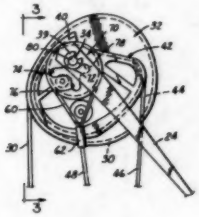


1. In a compound archery bow including a center handle section supporting upper and lower limbs having distal ends with attached grooves, eccentric, cam wheel assemblies on each mounted on a transverse axis, and bowstring and power tension cables extending between said wheel assemblies, that improvement which comprises a bowstring having a permanent loop at each end, a bowstring wheel on each said cam wheel assembly having formed thereon an integral, axially-extending chordal projection within the peripheral confines of said bowstring wheel, a knob formed on said chordal projection having one side shaped to provide a plurality of first open grooves lying in a plane perpendicular to the plane of said wheel assembly, said bowstring being wrapped around a sheave on said bowstring wheel and turned toward the center of said wheel in a direction opposite to the open side of said grooves to overlie said chordal projection, with the looped end releasably secured in one of said grooves.

4,926,833
COMPOUND BOW WITH ADJUSTABLE CABLE ANCHOR

Rex F. Darlington, 3540 Darton Rd., Hale, Mich. 48739

Filed Feb. 14, 1989, Ser. No. 310,343
Int. Cl.[5] F41B 5/00
U.S. Cl. 124—23.1 1 Claim

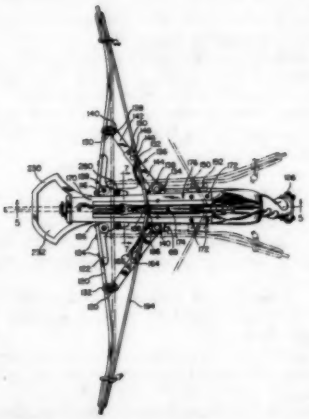


1. In a compound archery bow having bowstring pulleys and tension cable pulleys mounted on a common axle at each distal end of the bow and anchor points of the respective ends of the tension cable, that improvement in the anchor points for the ends of the tension cable which comprises a perforate disc mounted on each end of the tension cable having an external groove to receive a bight portion of a closed stable loop of a tension cable end, said disc having a reference point and formed therein a plurality of notches of different lengths around said reference point, each notch being open at an inner end to the reference point and having a bight at a closed end opposite to the reference point to receive and anchor on a pulley axle in various positions of adjustment of the tension cable.

4,926,834
FOLDING CROSSBOW

Glenn A. Chauvin, P.O. Box 807, Escatawta, Miss. 39552

Filed Jan. 26, 1989, Ser. No. 301,701
Int. Cl.[5] F41B 5/00
U.S. Cl. 124—25 9 Claims

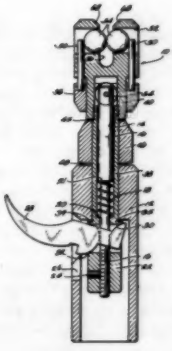


1. A crossbow comprising:
a main stock,
a secondary stock pivotally connected to said main stock and movable relative to said main stock between collapsed and extended positions,
a pair of prod members, each having inner and outer ends, said prod members pivotally connected at the inner ends thereof to said main stock and pivotable relative to said main stock between inoperative and operative positions,
a drawstring secured at opposite ends to said prod members,
a drive block movable along said main stock between cocked and released positions, said drawstring biasing said drive block toward said released position, and
a trigger for retaining said drive block in said cocked position so that when said prod members are in said operative position, an arrow can be loaded onto said crossbow, said trigger also able to release said drive block from said cocked position so that said drawstring can move said drive block along said main stock toward said released positon to fire the arrow,
wherein said main stock and said secondary stock can be retained in said collapsed position and said prod members can be retained in said inoperative position when the crossbow is not in use so that the crossbow is compact,
an arrow guide sight mounted on said main stock, said arrow guide sight comprising an L-shaped bracket secured to said main stock, a sight base, including an elongated cylindrical extension, secured to said bracket, said extension projecting forwardly relative to said sight base and being provided with a first cut away portion in its cylindrical wall, and
an alignment member including a second cut away portion, mounted for rotation on said extension,
wherein said alignment member can be rotated so that said first and second cut away portions are aligned and an arrow may be lowered through the aligned cut away portions to load said arrow for firing.

4,926,835
BALL BEARING TYPE BOW STRING RELEASE

Paul L. Peck, Fond du Lac, Wis., assignor to Archery Designs, Inc., North Fond du Lac, Wis.

Filed Jun. 7, 1989, Ser. No. 362,882
Int. Cl.[5] F41B 5/00
U.S. Cl. 124—35.2 9 Claims



1. A bow string release including,
a handle,
a head having a string receiving notch therein,
means freely rotatably mounting said head on said handle,
a collar slideably mounted on said head,
a cross bore in said head intersecting said notch,
a ball in said bore on each side of said notch,
a pair of holes in said head parallel to and on opposite sides of said notch and intersecting said cross bore,
a pair of pins each slidably mounted in one of said holes and fixed to said collar for movement between a first position in which said pins act on said balls to move said balls into

contact closing said notch and a release position in which said balls are separated and a bow string can pass between the balls,

a pull pin mounted on the axis of said head and connected to said collar and extending into said handle,

said handle being rotatable relative to said pull pin,

a trigger mounted in said handle and operative to actuate said pull pin to move said collar.

4,926,836

METHOD OF AND APPARATUS FOR DRESSING CUTTING EDGE OF CUT-OFF WHEEL

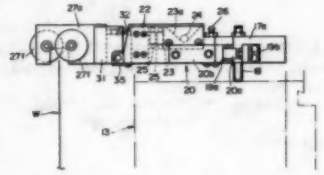
Seiichi Abe, Sodegaura, Japan, assignor to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 13, 1988, Ser. No. 181,202

Claims priority, application Japan, Jul. 31, 1987, 62-192478

Int. Cl.[5] B24B 53/00

U.S. Cl. 125—11.01 6 Claims



1. A method of applying a dressing, by using a rotary grinding wheel, to a peripheral cutting edge of abrasive grain formed on either an outer periphery or an inner periphery of a disc-shaped rotary cut-off wheel, the dressing method comprising the steps of: rotating both the grinding wheel and the cut-off wheel about their respective axes; bringing the grinding wheel into contact with the peripheral cutting edge of the cut-off wheel in such a manner that the axis of the grinding wheel is inclined, at an angle larger than 0° and smaller than 90°, to the axis of the cut-off wheel, when the axes of the grinding and cut-off wheels are viewed from a plane of projection perpendicular to the direction in which the grinding wheel and the cut-off wheel are aligned, said step of bringing the grinding wheel into contact with the peripheral cutting edge of the cut-off wheel including pressing the grinding wheel against the peripheral cutting edge by means of a spring so that the pressing force with which the grinding wheel contacts the cutting edge is adjusted to a level not greater than the elastic force of the spring, before the step of bringing the grinding wheel into contact with the peripheral cutting edge of the cut-off wheel, positioning the grinding wheel and a second rotary grinding wheel respectively at opposite sides of the cutting edge of the cut-off wheel, and wherein after positioning said grinding wheels, the step of bringing the grinding wheel into contact with the peripheral cutting edge of the cut-off wheel further includes moving both grinding wheels selectively along the axis of the cut-off wheel until one of the grinding wheels contacts one of the opposite side surfaces of the cutting edge, such that either of the opposite side surfaces of the cutting edge is selectively applied with a dressing.

4,926,837

COOKING OVENS

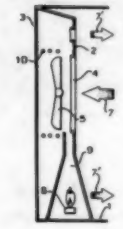
Christopher Parker, Chester, and Gordon T. Andrews, Bromley, both of England, assignors to New World Domestic Appliances Limited, Warrington, United Kingdom

Filed Jun. 27, 1989, Ser. No. 371,793

Claims priority, application United Kingdom, Jun. 28, 1988, 8815381

Int. Cl.[5] F24C 15/32

U.S. Cl. 126—21 H 11 Claims



1. A cooking oven comprising:

(a) oven means including a back wall, a bottom wall and a top wall,

(b) a second wall spaced from said back wall and extending from the bottom wall to the top wall of said oven means and forming with said back wall a heating compartment,

(c) said heating compartment including an electric heating means and a gas heating means,

(d) a fan means in said heating compartment,

(e) an intake vent in said second wall in proximity to said fan means,

(f) output vents in said wall spaced above and below said intake vent,

(g) a baffle extending upwardly from the bottom wall of said oven means in said heating compartment and spaced between said back wall and said second wall and extending upwardly to said intake vent,

(h) said gas heating means positioned between said baffle and said second wall adjacent said oven bottom wall,

(i) said baffle including an inside facing said second wall and an outside facing said back wall,

(j) said electric heating means positioned at the outside of said baffle,

(k) said oven including microwave means, and

(l) means for automatically controlling said electric heating means, said gas heating means and said microwave heating means.

4,926,838

CHARCOAL GRILLING UNIT

Charles C. Sells, Mt. Juliet, and Robert N. Martin, Brentwood, both of Tenn., assignors to Sportsman's Market, Inc., Batavia, Ohio

Filed Apr. 28, 1989, Ser. No. 345,195

Int. Cl.[5] A47J 37/00; F24B 3/00

U.S. Cl. 126—25 A 15 Claims

1. An outdoor grill for cooking relatively large quantities of food at one time on a grid surface, comprising:

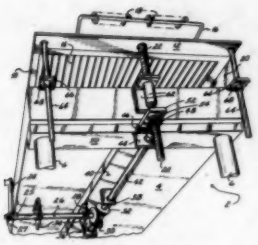
a fuel bed;

a plurality of vertical support members to maintain said fuel bed a distance above the ground and approximately parallel thereto;

a grid frame having terminus plates at opposite ends thereof, said frame positioned above said fuel bed;

a bevel gear transmission attached to said fuel bed and actuable by a crank, said transmission comprising a crank-connected bevel gear which meshes with two shaft bevel

gears, said shaft bevel gears rotating in opposed directions in response to rotation of said crank-connected bevel gear;
a plurality of driveshafts driveably connected to said shaft



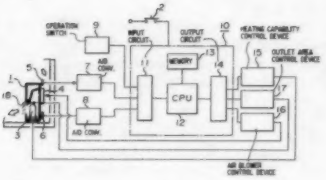
bevel gears of said bevel gear transmission and to said terminus plates for adjusting the height of said grid frame; and
a grid surface mounted on said grid frame.

4,926,839

HOT AIR TYPE HEATER

Sakuo Sugawara; Masanori Hara, and Takane Suzuki, all of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 26, 1989, Ser. No. 343,367
Claims priority, application Japan, Apr. 28, 1988, 63-104148; Apr. 28, 1988, 63-104150; Apr. 28, 1988, 63-104149; Apr. 28, 1988, 63-104147; May 17, 1988, 63-118208
Int. Cl.[5] F24C *5/04*
U.S. Cl. 126—96 **6 Claims**



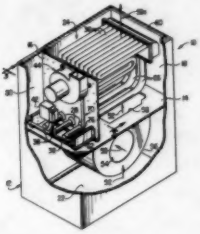
1. A heater comprising
a heater body containing a heating source;
an air blower for forcibly blowing off heated air from the heater body into a room, the heated air being produced by heat-exchanging with the heating source;
a first temperature detection element for detecting a temperature at an upper level in the room;
a second temperature detection element for detecting a temperature at a lower level in the room;
a sensation input means for enabling a user to input his or her sensation corresponding to an actual room temperature;
means for determining heating output of the heating source based on the difference between the temperature detected by the first temperature detection element and a first set temperature;
means for changing the outlet area of the heated air based on the difference between the temperature detected by the second temperature detection element and a second set temperature lower than the first set temperature to determine the blow-off speed of the heated air; and
a control means for changing the first set temperature and the second set temperature based on the input given through the sensation input means.

4,926,840

PILOT GAS BYPASS SYSTEM FOR FUEL-FIRED FURNACES

Timothy J. Shellenberger, and William T. Harrigill, both of Fort Smith, Ark., assignors to Rheem Manufacturing Company

Filed Sep. 28, 1989, Ser. No. 415,122
Int. Cl.[5] F24H *3/00*
U.S. Cl. 126—110 R **12 Claims**



1. Induced draft, fuel-fired furnace apparatus comprising:
a housing;
heat exchanger means, disposed within said housing, through which hot combustion products may be internally flowed to transfer heat to air flowed externally across said heat exchanger means;
blower means for flowing air to be heated externally across said heat exchanger means;
burner means selectively operable to receive fuel from a source thereof and discharge the received fuel;
pilot means for continuously maintaining within said housing a standing pilot flame operative to ignite fuel discharged from said burner means to thereby create hot combustion products from the discharged fuel, said pilot flame continuously generating hot combustion products within said housing;
draft inducing fan means connected to said heat exchanger means and connectable to an exhaust stack, said draft inducing fan means being selectively operable to sequentially draw hot combustion products discharged from said burner means through said heat exchanger means and discharge combustion products exiting said heat exchanger means into and through the exhaust stack when connected thereto; and
means for venting hot combustion products from said pilot flame into the exhaust stack through said draft inducing fan means, during idle periods thereof, in a manner precluding an appreciable amount of pilot flame combustion products from interiorly traversing said heat exchanger means.

4,926,841

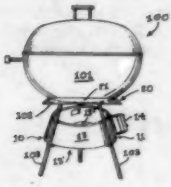
WEATHER PROOF ASH CONTAINMENT SYSTEM FOR BARBEQUES

Douglas M. Woolf, 105 Mount Etna Dr., Clayton, Calif. 94517

Filed Aug. 17, 1989, Ser. No. 394,913
Int. Cl.[5] F23J *1/00*
U.S. Cl. 126—243 **9 Claims**

1. An ash catching apparatus for barbeque grills including a cooking receptacle having an apertured bottom and a plurality of support legs projecting outwardly and downwardly with respect to the apertured bottom wherein the ash catching apparatus comprises:
an ash catching receptacle comprising an enlarged frusto-conical receptacle member dimensioned to be received between adjacent legs of said plurality of support legs;
a plurality of support members wherein each of the plurality of support members are operatively and movably disposed on respective ones of said plurality of support legs for

supporting the ash catching receptacle relative to the bottom of the cooking receptacle; and,



a weather ring including an outwardly and downwardly flared skirt member which is operatively attached to the bottom of the cooking receptacle.

4,926,842

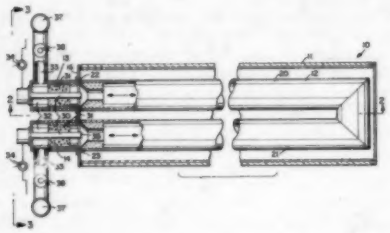
IMMERSION TUBE HEATER TREATER IMPROVED IMMERSION TUBE HEATER TREATER

James E. Watson, Southgate, Mich., and Theodore E. Davies, Hudson, Ohio, assignors to North American Mfg. Co., Cleveland, Ohio

Continuation of Ser. No. 49,577, May 11, 1987, abandoned. This application May 10, 1989, Ser. No. 352,702

Int. Cl.[5] F24H *1/20*

U.S. Cl. 126—360 R **6 Claims**



1. An improved heater for a containment vessel of an oil having a coking temperature of substantially 700 degrees F. and a desired temperature of substantially 250 degrees F., said improved heater comprising an immersion heater tube, said heater tube having two ends, said heater tube being in the containment vessel in contact with the oil, a bi-directional burner, said bi-directional burner being affixed to one end of said heater tube coaxially therewith, said bi-directional burner having an air intake/exhaust plenum, a second bi-directional burner, said second bi-directional burner being affixed to the other end of said heater tube coaxially therewith, said second bi-directional burner having an air intake/exhaust plenum, and control means to selectively operate said bi-directional burner and said second bi-directional burner by firing said burners and connecting said plenums of said burners to air intake or exhaust as appropriate to heat the entire length of the heater tube substantially uniformly to a temperature at least the desired temperature of 250 degrees F. but below the coking temperature of 700 degrees F. of the oil.

4,926,843

COOKING VESSEL

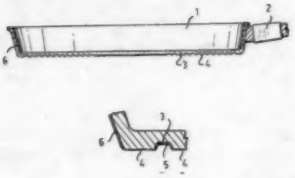
Henning L. Vocke, Helsingfors, and Pauli Saarenko, Järvenpää, both of Finland, assignors to Oy Alu AB, Jarvenpas, Finland

Continuation of Ser. No. 296,335, Jan. 10, 1989, abandoned, which is a continuation of Ser. No. 35,727, Apr. 8, 1987, abandoned, which is a continuation of Ser. No. 782,706, Oct. 1, 1985, abandoned. This application Jun. 6, 1989, Ser. No. 362,823

Claims priority, application Finland, Nov. 2, 1984, 844308; Jan. 21, 1985, 850259

Int. Cl.[5] A47J *27/00*

U.S. Cl. 126—390 **4 Claims**



1. A method of forming the bottom surface of a cooking vessel, the method comprising:

providing a cooking vessel having a bottom surface;

roll forming spaced, concentric grooves having widths of 4 to 7 mm and depths of 0.5 to 2 mm into the bottom surface of the cooking vessel, the spaces between adjacent ones of the grooves thereby being protrusions from the adjacent grooves;

providing layers of a heat-absorbing material only in the respective grooves; and

maintaining the heights of the layers from the grooves the layers are respectively in to less than that of the protrusions from the respective grooves comprises: supporting an inner surface of the cooking vessel that is opposite the bottom surface;

radially contacting the bottom surface with a conical shaping body having parallel ridges thereabout; and rotating the bottom surface of the cooking vessel and the conical shaping body while in contact, whereby to retain the grooves.

4,926,844

SEALING COLLAR FOR A RESUSCITATOR OR RESPIRATOR

John E. Lindley, 1410 20th Ave., Meridian, Miss. 39301

Filed Apr. 19, 1989, Ser. No. 340,523

Int. Cl.[5] A61H *31/02*

U.S. Cl. 128—30 **12 Claims**

1. A wall and collar for a pressure chamber of a resuscitator or respirator, said wall having a generally central opening for loosely enclosing the neck of a patient wherein in use a patient's head will be located on one side of the wall while the rest of a patient's body will be on the other side of the wall, comprising:

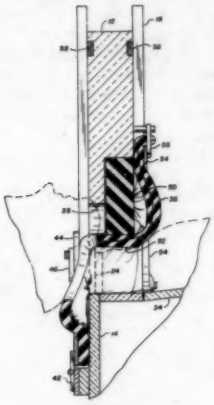
upper and lower wall sections together defining said opening;

means mounting said upper section for movement away from said lower section for reception of the neck of a supine patient in said opening, and back toward said lower section to loosely enclose the neck;

collar means of elastic sealing material for cradling and sealing against the for posterior neck, for gently wrapping and sealing against the posterior lateral neck and for pressing and sealing against the upper anterior torso adjacent the neck of a patient without pressing tightly against the jugular vein, carotid arteries trachea and other delicate structures of the anterior neck and anterior lateral neck of a patient, and

clamp means for pressing a lower portion of said collar

means against the head side of said wall about said opening and an for pressing upper portion of said collar means



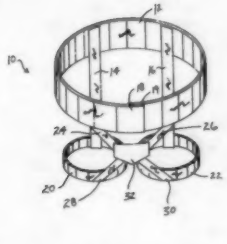
against the body side of said wall about said opening to form a seal between the head and body sides of said wall.

4,926,845

SACRUM SUPPORT DEVICE

Don W. Harris, P.O. Box 3490, Ft. Stewart, Ga. 31314

Filed Sep. 26, 1988, Ser. No. 248,981
Int. Cl.[5] A61F *5/24*
U.S. Cl. 128—78 **1 Claim**



1. A sacrum support device, comprising:
a generally horizontally extending waist strap having fastening means for securement around an individual's waist;
a pair of generally horizontally extending leg straps, each having fastening means for securement around an individual's leg;
a pair of generally vertical support straps connecting said leg straps to a front portion of said waist strap;
a pad formed from a soft resilient material;
said pad having a pentagonal shape with an apex pointing downwardly, away from said waist strap;
a first pair of diagonally extending pad support straps connecting said pad to a rear portion of said waist strap; and
a second pair of diagonally extending pad support straps connecting said pad to rear portions of said leg straps, whereby said pad is disposed between said vertical support straps and between said waist and leg straps in a position to protect an individual's sacrum.

4,926,846

METHOD AND DEVICE FOR LIMITING INTERMALLEOLAR EXPANSION

Lawrence G. Nassar, 33951 Glouster Cir., Farmington Hills, Mich. 48331

Filed Oct. 31, 1988, Ser. No. 264,529
Int. Cl.[5] A61F *3/00*
U.S. Cl. 128—80 H **4 Claims**

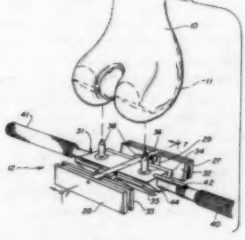
2. An exterior wrap for limiting intermalleolar expansion of a tibiofibular joint capsule without limiting said joint capsule's range of motion comprising:
a first independent elastomeric strip having two ends and a length approximately equal to the circumference of the external surface of said joint capsule plus an additional length to accommodate a first closure means, locating means disposed on said first steps;
said first closure means for said first independent elastomeric strip located at the ends of said first elastomeric strip;
a second independent elastomeric strip applied upon the exterior surface of said first independent elastomeric strip said second strip having two ends, the length of said second strip being slightly less than the length of said first strip and the width of said second strip being less than but at least half of the width of said first strip;
an orientation means disposed on said second independent elastomeric strip engageable with said locating means; and
a second closure means for said second independent elastomeric strip located at the ends of said second elastomeric strip.

4,926,847

SURGICAL CUTTING BLOCK

Thomas Luckman, Lakeville, Mass., assignor to Johnson & Johnson Orthopaedics, Inc., New Brunswick, N.J.

Filed Dec. 27, 1988, Ser. No. 290,545
Int. Cl.[5] A61F *5/04*
U.S. Cl. 606—88 **10 Claims**



10. A cutting guide to guide a cutting device to make cuts in a distal femur to prepare the distal femur to receive the femoral component of a total knee prosthesis comprising:
a body having as two first fixed guiding surfaces which are set at angels to the bone to be cut of from 0° to 10°, two first movable surfaces movable attached to the body which are capable of being moved toward or away from

the two first fixed surfaces to create slots to receive and position a cutting device with respect to the bone to be cut; two second fixed guiding surfaces which are set at an angle of 40° to 50° to the bone to be cut, two second movable surfaces attached to the body which are capable of being moved toward or away from the two second fixed surfaces to create slots to receive and position a cutting device with respect to the bone to be cut.

4,926,848

ADJUSTABLE ELASTIC BANDAGE

John W. Shimkus, 118 Pulteney St., Hammondsport, N.Y. 14840, and Jane M. Brownell, R.D. 4, Box 186, Fort Hill Rd., Bath, N.Y. 14810

Filed Sep. 2, 1988, Ser. No. 239,936
Int. Cl.[5] A61F *13/06*
U.S. Cl. 128—169 **10 Claims**

1. An adjustable strip of elastic adapted to be wrapped around a portion of a patient's body to be bandaged in a plurality of overlapping convolutions so that the inner end thereof will be held in place by succeeding convolutions, comprising:

(a) a first fastener component of a flexible material of sufficient flexibility to conform to the curvature of the underlying convolutions of said strip when wrapped around said body portion and having an opening therein receving a portion of said strip intermediate the ends of said strip, wherein:

1. said first fastener component is adjustable along the length of said strip so that it may be spaced from the outer end of the strip a distance substantially corresponding to the length of the outer convolution of the stretched strip,
2. said first fastener component has an outer portion comprised of a front outer face and a rear outer face, and
3. fibrous fastener fabric appears on both of said front outer face and said rear outer face of said first fastener component;

(b) a second fastener component fixed to the outer end portion of said strip and being adapted to cooperate with said outer portion of said first fastener component to separably connect said components together so as to secure the outer end portion of said elastic strip with respect to the remainder of said strip when said elastic strip has been wrapped on a patient, said first fastener component being readily movable when said elastic strip is in an unwrapped, extended state, wherein complementary fibrous fabric material appears on both of the front face and the rear face of said second fastener component.

4,926,849

APPARATUS FOR SEPARATING VERTEBRAE

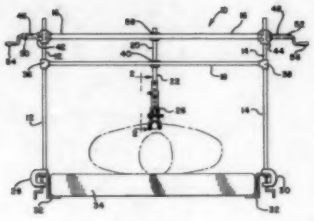
Ernest L. Downey, 10559 S. Ave. G, Chicago, Ill. 60617

Filed Dec. 19, 1986, Ser. No. 943,481
Int. Cl.[5] A61B *17/00*
U.S. Cl. 128—75 **16 Claims**

1. An apparatus useful to separate adjacent first and second vertebrae during surgery comprising:

support means; first and second grip means associated with said support means and being sized and structured to grip said first vertebra and said second vertebra, respectively;

first movement means associated with said first grip means and structured to be manually operated while said first grip means is gripping said first vertebra and said second grip means is gripping said second vertebra to move said first grip means to a desired position relative to said second grip means, to separate said first and second vertebrae and to hold said first grip mean in said desired position; and



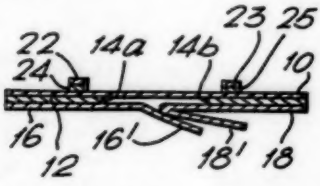
second movement means associated with said second grip means and structured to be manually operated independent of said first movement means while said first grip means is gripping said first vertebra and said second grip means is gripping said second vertebra to move said second grip means to a desired position relative to said first grip means, to separate said first and second vertebrae and to hold said second grip means in said desired position.

4,926,850

WOUND DRESSING

Gloria Y. Lott, Des Peres; Scott M. Britton, Ballwin, both of Mo., and Barry E. Constantine, Island Heights, N.J., assignors to Sherwood Medical Company, St. Louis, Mo.

Filed Nov. 30, 1988, Ser. No. 278,256
Int. Cl.[5] A61F *13/00*
U.S. Cl. 128—155 **14 Claims**



1. A dressing, comprising:

a plastic film having a wound contacting portion and lateral ends;

a uniform adhesive coating on at least a portion of one surface of said plastic film about said wound contacting portion defining an adhesive-free wound contacting window;

release liner means covering at least a portion of said adhesive coating and at least a portion of said wound contacting window of said plastic film, said release liner means being in releasable contact with said adhesive coating and including grasping means for enabling said release liner means to be peeled from said adhesive coating; and

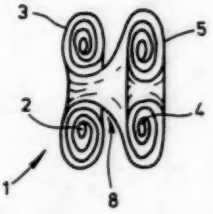
means adjacent at least one lateral side of said wound contacting window and remote from said lateral ends of said plastic film for varying abruptly the resistance offered by the release liner means to peeling from the adhesive coating thereby providing a signal to the user when the release

liner means have been peeled sufficiently to uncover said wound contacting window.

4,926,851
TUBULAR BANDAGE AND A METHOD FOR ITS APPLICATION

John L. Bulley, St. Columb, United Kingdom, assignor to JLB Textiles Limited, United Kingdom

Filed Aug. 22, 1988, Ser. No. 234,633
Int. Cl.[5] A61F *15/00*
U.S. Cl. 128—157 10 Claims

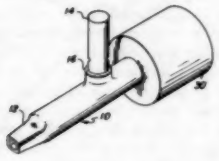


1. A tubular bandage comprising a length of tubular fabric knitted from a combination of substantially inelastic yarn and elastic yarn so as to have alternating circumferential rows of inelastic yarn and elastic yarn and having a first end portion rolled outwardly from the free end and the other end portion rolled inwardly from the opposite free end to form two rolls each constituted by nearly half the bandage.

4,926,852
MEDICATION DELIVERY SYSTEM PHASE ONE

Bart J. Zoltan, Old Tappan, N.J.; Beth L. Laube, and George K. Adams, III, both of Baltimore, Md., assignors to The Johns Hopkins University, Baltimore, Md.

Continuation-in-part of Ser. No. 877,331, Jun. 23, 1986, Pat. No. 4,790,305. This application Sep. 30, 1988, Ser. No. 251,454
Int. Cl.[5] A61M *11/00*
U.S. Cl. 128—200.23 8 Claims



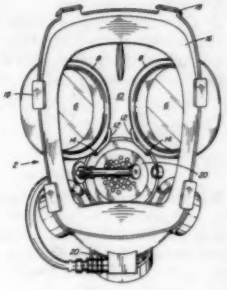
6. The invention according to claim 1, wherein said main body portion of said rigid housing is defined by axially collapsible wall means.

4,926,853
GAS MASK NOSE OCCLUDER

Pierre P. Meunier, Nepean, Canada, assignor to Her Majesty the Queen in Right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

Filed Jan. 29, 1988, Ser. No. 213,263
Claims priority, application Canada, Jan. 21, 1988, 557060
Int. Cl.[5] A62B *7/00*
U.S. Cl. 128—201.18 3 Claims

1. In a face mask having two rigid eyepieces having rims, a pliable full face covering carrying the eyepieces such that the eyepieces can be manually moved toward the face of a user, breathing means and sealing and securing means for sealing the mask securely to the head of a wearer, the improvement comprising nose occluder means including a pair of prong members each made of a material having sufficient rigidity to close the nostrils of a user, said prong members each being adjustably attached at one end thereof directly to an interior lower rim

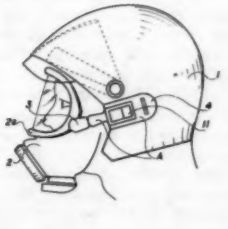


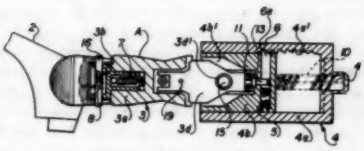
portion of a respective eyepiece at an angle with respect thereto so as to be directed inwardly toward the nose of the wearer, said pliable full face covering enabling said eyepieces to be manipulated toward the face to cause the prong members to press against the nose and close the nostrils.

4,926,854
PROTECTIVE HELMET WITH A STRAPLESS BREATHING PROTECTION MASK

Sven Bode, Berlin, Fed. Rep. of Germany, assignor to Sven Bode, Auergesellschaft GmbH, Berlin, Fed. Rep. of Germany

Filed Jun. 23, 1988, Ser. No. 210,655
Claims priority, application Fed. Rep. of Germany, Jun. 26, 1987, 3721662
Int. Cl.[5] A62B *17/04, 3/00;* A42B *300*
U.S. Cl. 128—201.23 13 Claims





1. A protective helmet with a strapless breathing protection mask in a detachable connection, which is formed by plug-in type and lockable connecting elements arranged on both sides of the helmet and the mask, the improvement comprising:

each connection element having a flexible plug-type part capable of limited rotation, arranged on the breathing

protection mask, and of a plug receptacle part arranged on the protective helmet;

the plug receptacle part has an adjusting device which can be adjusted to a number of different positions, and which holds the plug-type part in the plug receptacle part with positive force; and

wherein the plug receptacle part includes a housing with U-shaped cross-section and a slide which can move in the housing in longitudinal direction against the force of a first spring disposed in the housing and which constitutes the adjusting device.

4,926,855

RESPIRATOR

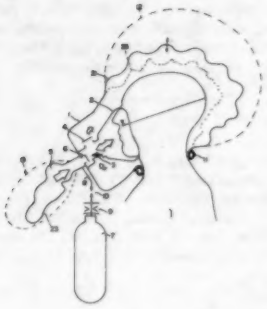
Ivan Hellquist, Sollentuna, and Carl P. M. Mühlmann, Lidingo, both of Sweden, assignors to Interspiro AB, Lidingo, Sweden

Continuation-in-part of Ser. No. 774,625, Sep. 11, 1985. This application Jan. 29, 1987, Ser. No. 8,195

Claims priority, application Sweden, Sep. 21, 1984, 8404752

Int. Cl.[5] A62B *18/10*

U.S. Cl. 128—201.28 **19 Claims**



1. A rescue type breathing apparatus comprising:

a hood adapted to enclose a user's head and neck, said hood being at least substantially made of a flexible material and including an elastic neck seal means for allowing gas from the inside of said hood to escape to the outside when the pressure in said hood exceeds the ambient gas pressure and substantially preventing leakage of the ambient gas into said hood when the ambient gas pressure exceeds the pressure in said hood;

a face mask mounted inside said hood, said face mask including gas communication means for allowing passage of breathing gas between said hood and said face mask;

gas supply means connected to said face mask for supplying breathing gas to said face mask;

controlling means responsive to changes in gas pressure in said face mask during the inhalation and exhalation phase of a respiratory cycle of the user for allowing the flow of said breathing gas from said gas supply means to said mask during at least the first part of the inhalation phase in response to a first inhalation demand by the user;

said gas communication means including first and second regulating means responsive to changes in gas pressure in said face mask;

said first regulating means allowing passage of gas including said breathing gas from said face mask into said hood in response to exhalation and said second regulating means allowing passage of gas including said breathing gas from said hood into said face mask during the second part of said inhalation phase in response to subsequent inhalation demand by the user.

4,926,856

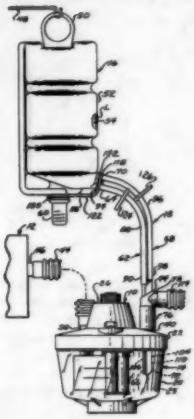
FEEDING SYSTEM

Orlando D. Cassbio, Jr., Bristol, Wis., and Earl R. Refsland, Arlington Heights, Ill., assignors to Hudson Oxygen Therapy Sales Company, Temecula, Calif.

Continuation of Ser. No. 87,135, Aug. 19, 1987, abandoned, which is a continuation of Ser. No. 747,219, Jun. 21, 1985, abandoned. This application Feb. 17, 1988, Ser. No. 156,778

Int. Cl.[5] A61M *16/00*; F23D *11/00*

U.S. Cl. 128—203.26 **11 Claims**



1. A feeding system, comprising:

a humidifier;

a reservoir housing a liquid above the humidifier;

first elongated conduit means for feeding liquid from the reservoir to the humidifier and having an upper end and a lower end;

second elongated conduit means alongside the first conduit means for passing air from the humidifier to the reservoir and having an upper end and a lower end;

means for connecting the upper end of the first and second conduit means in fluid communication to the reservoir below the level of liquid in the reservoir; and

means for connecting the conduit means to the upper part of the humidifier with the lower end of the first and second conduit means located inside the humidifier with the lower end of the first conduit means being located adjacent the lower end of the second conduit means, and with the lower end of the first conduit means being located above at least a portion of the second conduit means and the lower end of the second conduit means being cut off at a single angle through the second conduit means relative to the longitudinal axis of the second conduit means.

4,926,857

DEVICE FOR TREATING LIFE FORMS WITH TWO DIFFERENT TYPES OF FOCUSED ACOUSTICAL WAVES

Gerd Wessels, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 16, 1988, Ser. No. 156,240

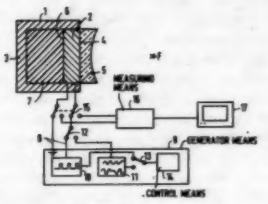
Claims priority, application Fed. Rep. of Germany, Feb. 16, 1987, 3704836.8

Int. Cl.[5] A61B *17/22*

U.S. Cl. 128—24 A **16 Claims**

1. A device for generating focused, acoustical waves for treating life forms, said device comprising an electrically drivable acoustical wave means for generating acoustical waves for treating a life form, means for focusing the acoustical waves generated by the acoustical wave means, and an electrical generator means for driving the acoustical wave means, the

generator means comprising two separate generator means with one of the two generator means producing an electrical signal for driving the acoustical wave means to generate shock waves for treating the life form and the other of the two gener-



ator means producing an electrical signal for driving the acoustical wave means to generate a periodic acoustical wave for treating the life form and the device further comprising switch means for connecting at least one of the two generator means to the acoustical wave means.

4,926,858

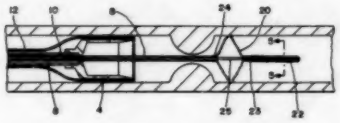
ATHERECTOMY DEVICE FOR SEVERE OCCLUSIONS

Hanson S. Gifford, III, Palo Alto; John B. Simpson, Woodside, and Peter S. Brown, Los Altos Hills, all of Calif., assignors to Devices for Vascular Intervention, Inc., Redwood City, Calif.

Continuation of Ser. No. 45,916, May 1, 1987, abandoned, which is a continuation of Ser. No. 732,691, May 10, 1985, abandoned, which is a continuation-in-part of Ser. No. 615,298, May 30, 1984, abandoned. This application Aug. 7, 1989, Ser. No. 391,636

Int. Cl.[5] A61F *17/32*

U.S. Cl. 606—159 **51 Claims**



1. An atherectomy device for removal of material of an atheroma from a vascular vessel, said device comprising:

a flexible tubular member adapted to be inserted into the vessel and having proximal and distal extremities,

flexible drive means having proximal and distal extremities and disposed within said tubular member for rotational and axial movement therein, said drive means extending from the proximal to distal ends of the tubular member,

a cup-shaped cutter carried by the distal extremity of the flexible drive means, said cutter having a distally extending annular cutting surface and an interior collection chamber, and

means carried by the proximal extremity of the flexible tubular member and coupled to the flexible drive means for rotating the cutter independently of rotation of the tubular member and for axially extending and retracting the cutter independent of axial movement of the tubular member,

whereby said cutter is movable axially from a position fully received by the tubular member to an axially extended position wherein the cutting surface is spaced forwardly of the distal extremity of the tubular member so that the cutter is capable of engaging and severing the atheroma with the severed portions of the atheroma being received in the collection chamber.

4,926,859

A MEDICAL TREATMENT DEVICE FOR TREATING AN UNDESIRED FORMATION IN A LIVING BODY

John E. Field, 1 Bebraham Road, Cambridge, Great Britain (CB2 2RB); John P. Dear, Rapley, Oakley Road, Bromley, Great Britain (BR2 8HQ), and Peter N. Davies, 2 Ditton Forest Cottages, Newmarket, Great Britain

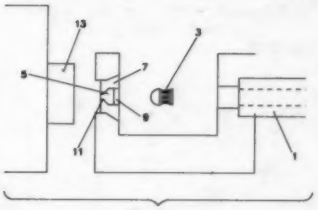
PCT No. PCT/GB86/00737, § 371 Date Jul. 5, 1988, § 102(e) Date Jul. 5, 1988, PCT Pub. No. WO87/03468, PCT Pub. Date Jun. 18, 1987

PCT Filed Dec. 4, 1986, Ser. No. 203,452

Claims priority, application United Kingdom, Dec. 4, 1985, 8529824

Int. Cl.[5] A61F *5/46*

U.S. Cl. 128—24 A **10 Claims**



1. A medical treatment device for treating a target in a living body which takes the form of an undesired solid formation, the device comprising:

a chamber for accommodating a charge of material of low density;

a nozzle forming an outlet from said chamber;

a receiving aperture communicating with the chamber and arranged to receive a slug of a density higher than said low density material projected at high speed towards the aperture, thereby to transmit the impacting force of the slug to the charge in a chamber so that the charge is extruded through the nozzle as a pulsed jet;

means for projecting the slug towards the receiving aperture; and

a guide tube connected to the nozzle and arranged to direct the pulsed jet, issuing from the nozzle, substantially without loss of kinetic energy and towards the target so as to effect cleavage of the solid formation.

4,926,860

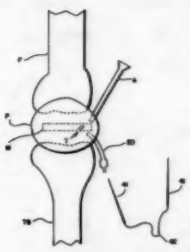
ARTHROSCOPIC INSTRUMENTATION AND METHOD

James D. Stice, Minneapolis; Chester E. Sievert, Jr., St. Paul, and Steven C. Christian, Crystal, all of Minn., assignors to Flexmedics Corporation, Minneapolis, Minn.

Filed Feb. 5, 1988, Ser. No. 152,652

Int. Cl.[5] A61B *17/06*; A61M *25/00*

U.S. Cl. 606—144 **19 Claims**



1. Arthroscopic instrumentation comprising a cannula hav-

ing a curved lumen, an end thereof being directable to an operative location; and an elongated, flexible, normally straight shape memory alloy probe receivable in the cannula for introduction to the operative location, the cannula being configured to cause the probe to bend during its passage through the curved lumen, the shape memory character of the probe causing the probe to exit from the end of the cannula in a substantially straight orientation.

4,926,861

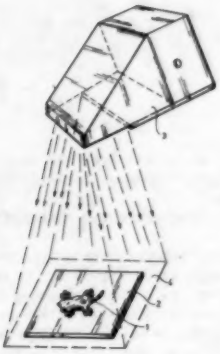
METHOD FOR IN VIVO TREATMENT OF TUMOROUS TISSUES ON BODY SURFACES

Martha Fenyo, Budapest, Hungary; Helmut Borberg, Gladbach, and Janos G. Kadar, Cologne, both of Fed. Rep. of Germany, assignors to Harrier Inc., Salt Lake City, Utah

Filed Oct. 8, 1987, Ser. No. 106,544

Int. Cl.[5] A61N *5/00*

U.S. Cl. 128—395 **6 Claims**



1. Method for in vivo treatment of tumorous tissues on body surfaces comprising the step of irradiating said tissues by polarized light of predetermined intensity, said polarized light predominantly including wavelength components exceeding 300 nm and substantially excluding ultraviolet components, wherein said intensity is between 20 and 150 mW/cm^2, and wherein said step of irradiation is carried out at least once a day for at least one period of at least 2 minutes duration.

4,926,862

DEFIBRILLATION SYSTEM

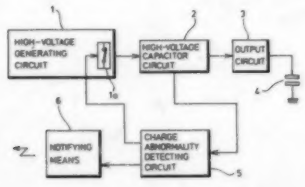
Nobukazu Miyajima, Tokorozawa; Akira Tanaka, Okegawa, and Masaru Shinoda, Tokyo, all of Japan, assignors to Nihon Kohden Corporation, Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,823

Claims priority, application Japan, Jul. 11, 1987, 62-106745[U]

Int. Cl.[5] A61N *1/00*

U.S. Cl. 428—419 D **6 Claims**



1. A defibrillation system comprising:

a high voltage generating circuit;

a high voltage capacitor circuit which is adapted to be charged with a high voltage by said high voltage generating circuit and which includes a metallized plastic film capacitor;

an output circuit which includes at least a switch and is adapted to apply said high voltage to a paddle mounted on the body of a patient;

a charge abnormally detection circuit for detecting either a sharp increase in charge current or a sharp drop in charge voltage across said metallized plastic film capacitor which is caused by a dielectric breakdown thereof;

a notifying means for notifying an operator of said defibrillation system of detected charge current or charge voltage abnormality, said notifying means responding to a detection signal produced by said charge abnormality detection circuit; and

a switch circuit for inhibiting in response to said detection signal, the charging of said capacitor to a high voltage using said high voltage generating circuit.

4,926,863

RATE RESPONSIVE CARDIAC PACEMAKER

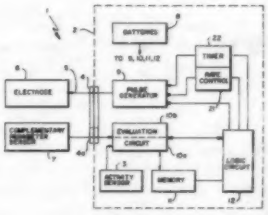
Eckhard Alt, Munich, Fed. Rep. of Germany, assignor to Intermedics, Inc., Angleton, Tex.

Filed Sep. 10, 1987, Ser. No. 94,875

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1986, 3631155

Int. Cl.[5] A61N *1/00*

U.S. Cl. 128—419 PG **10 Claims**



1. A rate responsive cardiac pacemaker for implantation in a patient, comprising

activity sensor means for converting mechanical movements of the patient to an electrical signal representative thereof,

means responsive to said electrical signal for passing only a portion thereof in a frequency range below 4 Hz to discriminate against signal components arising from other than physical activity of the patient,

processing means responsive to the passed portion of the signal to recover therefrom a predetermined variable signal component other than frequency of amplitude crossings relative to a threshold value, for producing an output signal representative of true physical body activity, and

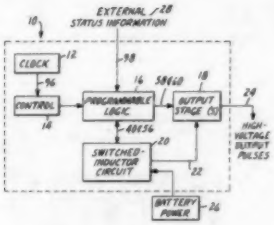
means responsive to said output signal for generating pulses at a rate that varies depending on said predetermined signal component to stimulate the patient's heart at a rate according to the state of true physical body activity of thee patient.

4,926,864

BIOLOGICAL TISSUE STIMULATOR WITH TIME-SHARED LOGIC DRIVING OUTPUT TIMING AND HIGH VOLTAGE STEP-UP CIRCUIT

Joel R. Dufresne, and Alan P. Dieken, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 42,166, Apr. 24, 1987, abandoned. This application May 30, 1989, Ser. No. 361,784
Int. Cl.[5] A61N *1/32*
U.S. Cl. 128—421 10 Claims



1. A biological tissue stimulator, comprising:

a low-voltage direct current power source;

step-up voltage means operatively coupled to said low-voltage direct current power source for converting said low-voltage direct current power source to a high-voltage direct current output;

said step-up voltage means having high-voltage storage means coupled to said high-voltage direct current output for storing the voltage of said high-voltage direct current output;

timing means powered by said low-voltage direct current power source for automatically alternately supplying a plurality of switching signals to said step-up voltage means and supplying a plurality of timing signals; and

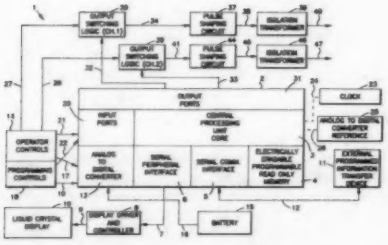
output circuit means operatively coupled to said high-voltage storage means and to said timing means for providing a biological tissue stimulation pulse from said high-voltage direct current output in response to said plurality of timing signals.

4,926,865

MICROCOMPUTER-BASED NERVE AND MUSCLE STIMULATOR

Paul S. Oman, 4701 Island View Dr., Mound, Minn. 55364

Continuation of Ser. No. 103,589, Oct. 1, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 298,782
Int. Cl.[5] A61N *1/00*
U.S. Cl. 128—421 12 Claims



1. An electrical stimulator for use by a human patient, comprising:

(a) means for generating a pulsed signal, said pulsed signal having parameters including an amplitude, a pulse width and a frequency, the parameters having values;

(b) means, cooperatively connected to said generating means, for controlling the parameters of said pulsed signal, said controlling means including:

(i) operator control means for adjusting the values of a first subset of the parameters of said pulsed signal, said first subset of the parameters including signal current amplitude;

(ii) first programming control means for establishing the values of a second subset of the parameters of said pulsed signal including signal modulation amplitude, on time, off time, rise time, signal modulation rate, type of signal modulation, signal pulse width, and signal pulse frequency;

(iii) second programming control means for selectively initiating and terminating access to said first programming control means, wherein upon termination of access to said first programming control means, the values of said second subset of the parameters may not be varied until access to said first programming control means is initiated; and

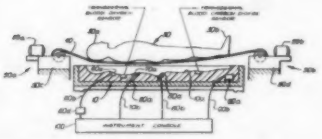
(c) a microprocessor, operatively connected to said first and second programming control means, wherein said first and second programming control means supplies input data to said microprocessor, said microprocessor operatively connected to a non-volatile electrically erasable programmable read only memory to store parameters.

4,926,866

SYSTEM FOR GATHERING PHYSIOLOGICAL DATA

Arnold St. J. Lee, 2008 Cotner Ave., Los Angeles, Calif. 90025

Continuation of Ser. No. 73,641, Jul. 15, 1987, abandoned, which is a division of Ser. No. 786,746, Oct. 11, 1985, Pat. No. 4,681,098. This application Oct. 24, 1988, Ser. No. 262,051
Int. Cl.[5] A61B *5/00*
U.S. Cl. 128—630 1 Claim



1. A system for accurately and reproducibly gathering physiological data taken from a subject's body, the system comprising:

steady means for stationing the subject's body in a reproducible supine position, the steady means including a rigid body mold having an impression intimately matching the entire length of the dorsal portion of the subject's body; and

sensor means mounted in a defined position in said steady means and positioned so as to have a defined position relative to the subject's body when the subject is placed in said steady means for taking physiological data from the body.

4,926,867

LIGHT-REFLECTING AND HEATING TYPE OXIMETER

Masahiko Kanda, and Yuichi Miyagawa, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 54,889, May 27, 1987, abandoned. This application May 19, 1989, Ser. No. 355,842
Claims priority, application Japan, May 27, 1986, 61-121896
Int. Cl.[5] A61B *5/00*
U.S. Cl. 128—633 8 Claims

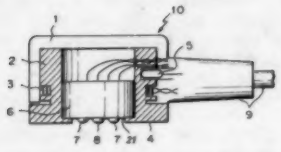
1. An oximeter sensor for non-invasively measuring oxygen

saturation of blood contained within a part of a living body comprising:

optical sensor means for measuring oxygen blood saturation, said optical sensor means including:

a housing containing a flat surface end adaptable to face said body part,

means for emitting measuring light having at least two different wavelengths protruding from said flat surface end, said light emitting means including at least two



light emitting elements that emit different wavelengths of measuring light, and

means for receiving said measuring light protruding from said flat surface end between said at least two light emitting elements; and

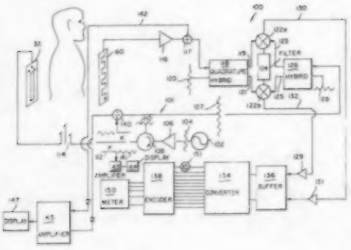
means for controllably heating said body part containing a contact surface adaptable to be placed on said body and disposed around and protruding from said flat surface and of said housing substantially the same amount as said light emitting means and said light receiving means.

4,926,868

METHOD AND APPARATUS FOR CARDIAC HEMODYNAMIC MONITOR

Lawrence E. Larsen, 308 Hamilton Ave., Silver Spring, Md. 20901

Filed Apr. 15, 1987, Ser. No. 38,952
Int. Cl.[5] A61B 5/00
U.S. Cl. 128—653 R **4 Claims**



1. Apparatus for cardiac hemodynamic monitoring, comprising

(a) flexible transmitting antenna means adapted for mounting adjacent to the back of a patient;

(b) transmitter means connected with said transmitting antenna means for generating a signal having a frequency between 900 and 930 MHz which is transmitted by said transmitting antenna means through the mediastinum of the patient, said signal being altered as a function of cardiac hemodynamic operation;

(c) receiving antenna means adapted for mounting adjacent to the chest of the patient for receiving said altered signal, said transmitting and receiving antenna means providing close coupling to the chest wall of the patient;

(d) means connected with said receiving antenna means for processing said received signal to produce outputs representing the magnitude and phase angle, respectively, of a bistatic scattering parameter (S_{21}l) as functions of time on a heartbeat by heartbeat basis; and

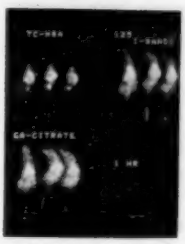
(e) display means for displaying said outputs representing the magnitude and phase angle of said bistatic scattering parameter to provide a visual indication of cardiac hemodynamic operation.

4,926,869

METHOD FOR THE DIAGNOSIS AND TREATMENT OF INFLAMMATION

Robert H. Rubin, Brookline, and H. William Strauss, Newton, both of Mass., assignors to The General Hospital Corporation, Boston, Mass.

PCT No. PCT/US87/00079, § 371 Date Nov. 13, 1987, § 102(e) Date Nov. 13, 1987, PCT Pub. No. WO87/04351, PCT Pub. Date Jul. 30, 1987
Continuation-in-part of Ser. No. 819,585, Jan. 16, 1986, abandoned. This PCT application Jan. 12, 1987, Ser. No. 93,500
Int. Cl.[5] A61B 5/00
U.S. Cl. 128—654 **29 Claims**



1. A method of detecting an inflammation site in vivo in an individual which comprises:

(a) administering to said individual a diagnostically effective amount of an agent, wherein said agent consists essentially of a detectably labeled immunoglobulin or a fragment thereof, and said immunoglobulin substantially accumulates at said site when said site is inflamed, and

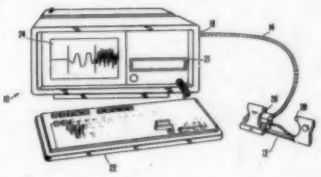
(b) detecting said detectably labeled immunoglobulin.

4,926,870

METHOD AND APPARATUS FOR ULTRASONIC ANALYSIS OF BONE STRENGTH IN VIVO

Gary H. Brandenburger, Maynard, Mass., assignor to Osteo-Technology, Inc., Cambridge, Mass.

Filed Aug. 30, 1988, Ser. No. 238,282
Int. Cl.[5] A61B 8/00
U.S. Cl. 128—660.01 **32 Claims**



1. A method for directing an ultrasonic signal along a desired ultrasonic path through a member, the ultrasonic signal being capable of propagating along a plurality of ultrasonic paths and the member interacting with ultrasonic signals differently along each of the plurality of paths, the method comprising the steps of:

(a) positioning an ultrasonic transmitter and an ultrasonic receiver proximate the member to establish a direct ultrasonic path between said transmitter and said receiver approximately along said desired path;

(b) launching an ultrasonic signal into the member toward the receiver;

(c) receiving the launched ultrasonic signal after it propagates through the member and producing a received electronic signal representative of the ultrasonic signal received by said receiver;

(d) signal conditioning said received electronic signal to produce a conditioned electronic waveform;

(e) comparing selected characteristics of the conditioned electronic waveform with corresponding selected characteristics of a canonical waveform, said canonical waveform being obtained due to the interaction of the member with said launched ultrasonic signal as said launched ultrasonic signal propagates at least along said desired path through the member; and

(f) repositioning said transmitter and said receiver at different orientations relative to the member to establish different ultrasonic pathways until said selected characteristics of said conditioned electronic waveform are substantially the same as said corresponding selected characteristics of said canonical waveform, thereby indicating that said ultrasonic signal launched from said transmitter has propagated along at least said desired path to said receiver.

4,926,871

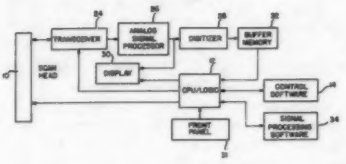
APPARATUS AND METHOD FOR NON-INVASIVELY AND AUTOMATICALLY MEASURING THE VOLUME OF URINE IN A HUMAN BLADDER

Dipankar Ganguly, Redmond, and David Giuliani, Mercer Island, both of Wash., assignors to International Biomedics, Inc., Bothell, Wash.

Continuation of Ser. No. 5,152, Sep. 30, 1987, abandoned, which is a continuation-in-part of Ser. No. 732,344, May 8, 1985, abandoned. This application Jul. 28, 1988, Ser. No. 226,148

Int. Cl.[5] A61B *8/00*

U.S. Cl. 128—660.07 **8 Claims**



1. An apparatus for automatically measuring the volume of urine in a human bladder defined by a border, comprising:

means for transmitting a plurality of ultrasound signals into the bladder in first and second planes, wherein the first and second planes are in first and second directions, respectively, which are substantially orthogonal to each other and wherein the transmitting means is movable so that ultrasound signals may be transmitted into the bladder in a plurality of planes in both the first and second directions as the transmitting means is moved;

means for receiving the returning plurality of ultrasound signals from each of said first and second planes;

means for developing initial ultrasound image information of the bladder in said first and second planes;

means for automatically processing the initial ultrasound image information to accurately determine the true border of the bladder in the first and second planes and develop enhanced ultrasound image information therefor;

means for displaying at least one of the initial ultrasound image information and the enhanced ultrasound image information;

means for selectively storing the enhanced ultrasound image information for said first and second planes;

means for automatically determining the distance between the opposing portions of the border of the bladder for each ultrasound signal in said first and second planes from the enhanced ultrasound image information;

means for automatically determining the area of the bladder in said first and second planes from the determined distance information;

means for automatically determining the volume of said bladder and hence the volume of urine in the bladder from the determined areas of the bladder in said first and second planes; and

means for displaying said volume in numeral form, wherein the apparatus is characterized in that the initial ultrasound image information, the enhanced ultrasound image information, and the volume of urine in the bladder are provided in substantially real time.

4,926,872

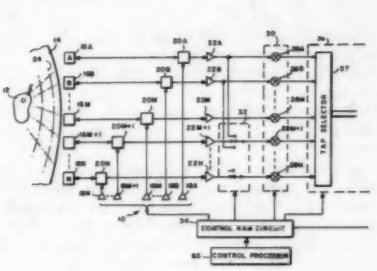
ULTRASONIC TRANSDUCER SYSTEM AND METHOD FOR THE OPERATION THEREOF

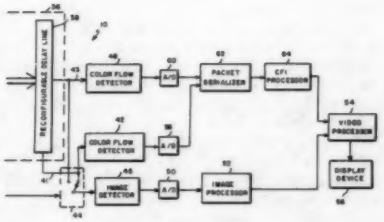
George A. Brock-Fisher, Andover; Paul R. Kranz, Harvard; James R. Mniece, Waltham, all of Mass.; Karl E. Thiele, Derry, N.H.; Bernard J. Savord, Ithaca, N.Y., and Richard B. Smith, Tewksbury, Mass., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 28, 1988, Ser. No. 173,763

Int. Cl.[5] A61B *8/00*

U.S. Cl. 128—661.01 **23 Claims**





1. An ultrasonic transducer system comprising:

a plurality of ultrasonic transducer elements;

means for transmitting at least two different types of ultrasonic lines from said elements to a selected target;

means for receiving ultrasonic echo signals from said elements in response to said at least two different types of lines;

a tapped delay line adapted to sum the received echo signals in a predetermined manner;

means for utilizing an output of the delay line to display a representation of echo signals received in response to each type of transmitted line; and

means for configuring the delay line so as to cause serial processing of echo signals received in response to one

type of line and to cause parallel processing of echo signals received in response to a second type of line.

4,926,873

METHOD FOR MEASURING BLOOD PRESSURE AND APPARATUS FOR AUTOMATED BLOOD PRESSURE MEASURING

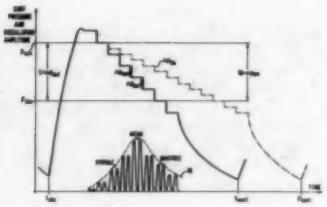
Michael Frankenreiter, Sindelfingen, Fed. Rep. of Germany, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 20, 1989, Ser. No. 325,627

Claims priority, application European Pat. Off., Aug. 1, 1988, 88-112-448.1

Int. Cl.[5] A61B 5/02

U.S. Cl. 128—681 **6 Claims**



1. A method for measuring blood pressure of a subject, the method comprising the steps of:

(a) applying a blood pressure cuff about a subject's limb that contains an artery;

(b) inflating the cuff to a pressure p_{max} above the systolic pressure p_{sys} of the subject, thereby occluding flow in the artery;

(c) reducing cuff pressure from p_{max} to a pressure p_{min} below the diastolic pressure p_{dia} of the subject in a sequence of cuff pressure abrupt decrements Δp_{def} of approximately equal magnitude in a sequence of time intervals, where the pressure decrement for each time interval in cycle i+1 ($i \geq 1$) is determined by dividing the difference of two pressure values p_{2ci} and p_{1ci} by a positive constant that is independent of subject and that is no greater than six, where p_{1ci} and p_{2ci} are pressure values determined in cycle i that satisfy the relations $p_{min} \leq p_{1ci} < p_{2ci} \leq p_{max}$, thereby permitting sequentially increasing flow of blood through the artery;

(d) determining the artery pressure within each time interval for which cuff pressure is approximately constant and determining p_{sys}, p_{dia} and the mean arterial pressure for the cycle i+1;

(e) displaying the blood pressure values p_{sys} and p_{dia} for the subject for the cycle i+1; and

(f) repeating the preceding method steps (b), (c) and (d) at least once.

4,926,874

METHOD FOR DETERMINING BLOOD PRESSURE

Arnold St. J. Lee, 2008 Cotner Ave., Los Angeles, Calif. 90025

Division of Ser. No. 801,248, Nov. 25, 1985, Pat. No. 4,841,980. This application Jan. 30, 1989, Ser. No. 302,772

Int. Cl.[5] A61B 5/02

U.S. Cl. 128—682 **2 Claims**

1. A method for determining the blood pressure of a test specimen, the steps of the method including:

providing a blood pressure recorder system having an inflatable cuff in flow communication with a pressurized gas source, the blood pressure recorder system including:

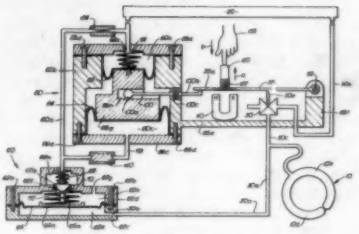
a three-way inflation valve in flow communication with the inflatable cuff and the pressurized gas source;

a pressure sensor having only two chambers with each chamber having a pressure responsive member;

means, responsive to the sensor, for operating the inflation valve;

a conduit connecting the pressurized gas directly from the pressurized gas source to one chamber of the pressure sensor; and

a flow restricted conduit connecting the pressurized gas from the pressurized gas source to the other chamber of



the pressure sensor whereby the pressure sensor facilitates deflation of the cuff when a predetermined small gas pressure remains in the cuff for a predetermined time period;

attaching the cuff to the test specimen in an operable manner; and

employing the blood pressure recorder system to determine the blood pressure of the test specimen.

4,926,875

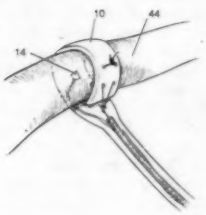
IMPLANTABLE AND EXTRACTABLE BIOLOGICAL SENSOR PROBE

Raphael S. Rabinovitz, and Craig J. Hartley, both of Houston, Tex., assignors to Baylor College of Medicine, Houston, Tex.

Continuation-in-part of Ser. No. 147,368, Jan. 25, 1988, abandoned. This application May 26, 1988, Ser. No. 199,163

Int. Cl.[5] A61B 5/02

U.S. Cl. 128—691 **13 Claims**



1. An implantable and extractable probe comprising:

at least one biological sensor;

lead wires extending from said sensor;

a flexible band to which said sensor is fixed;

a suture means terminating in ends;

means for retaining part of the suture means inside the flexible band with the ends of the suture means extending outside the band; and

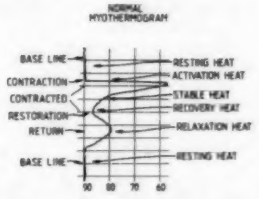
means for selectively releasing the part of the suture means head inside said flexible band.

4,926,876

DIAGNOSIS OF MUSCLE PROBLEMS

John M. H. Howard, 100 Crabtree Lane, Harpenden, Herts AL5 5RF, England

Filed Oct. 31, 1988, Ser. No. 264,624
Int. Cl.[5] A61B *5/00*
U.S. Cl. 128—736 **10 Claims**



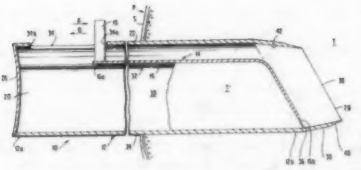
1. A process for diagnosing suspected muscle problems in a subject, which comprises measuring the difference in temperature between opposite limbs of the subject while one limb is at rest and the other is exercised determining said difference as a function of time, and diagnosing muscle problems from the determined function.

4,926,877

BIOPSY NEEDLE WITH COMPLETELY CLOSABLE CUTTING END BORE

John R. Bookwalter, 9 Belmont Ave., Brattleboro, Vt. 05301

Filed Apr. 24, 1989, Ser. No. 342,198
Int. Cl.[5] A61B *10/00*
U.S. Cl. 128—754 **6 Claims**



1. A biopsy needle for penetrating, severing and removing tissue specimens comprising:

a hollow tubular needle body of racetrack cross-section, having a proximate hub end, and an open, distal end, said hollow tubular needle body being defined by laterally opposed, parallel straight walls integrally joined along opposite edges by respective, opposed arcuate walls, said distal end of said hollow tubular needle body terminating in an axially oblique, sharp cutting edge forming a pointed tip, at least the straight walls of said hollow tubular needle body narrowing toward each other at said body distal end to form a reduced lateral width bore, guide means provided within the hollow tubular needle body at the juncture between one arcuate wall and the opposed parallel straight walls, a thin flexible strip form metal, guillotine cutting blade of a width less than the distance between the opposed parallel straight body walls positioned between said guide means and said one arcuate wall for longitudinal sliding movement toward and away from said distal end, said flexible guillotine cutting blade having a width in excess of the distal end opening within said hollow tubular needle body such that said flexible guillotine cutting blade is prevented from projecting through said distal end opening, and is deflected toward said tip during sliding movement in a direction tending to close off said opening, said guillotine cutting blade terminating in a transverse curved leading edge conforming to the curvature of the hollow tubular needle body distal end other arcuate wall, and

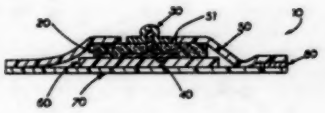
means carried by said blade to shift said blade between an axially projected position wherein said flexible guillotine cutting blade closes off said distal end opening and a retracted position where tubular needle body distal end is open to receive tissue to be severed.

4,926,878

MEDICAL ELECTRODE

Marvin L. Snedeker, Grand Rapids, Mich., assignor to Labeltape Meditect Inc., Grand Rapids, Mich.

Filed Dec. 29, 1988, Ser. No. 291,458
Int. Cl.[5] A61N *1/04*
U.S. Cl. 128—798 **5 Claims**



1. A medical electrode comprising:

a highly conductive dispersive layer having an aperture therein and an upper surface and a lower surface;

a nonconductive eyelet having an eyelet post projecting upwardly from an eyelet base having an upper surface and a lower surface, which base radiates outwardly from said post.

a conductive stud for mating engagement with said eyelet, said stud including a stud post projecting upwardly from a stud base, said base radiating outwardly from said post;

said post of said eyelet projecting through said aperture in said conductive dispersive layer and matingly engaging the interior of said stud post whereby said stud and eyelet are secured together with said eyelet base contacting said lower surface of said conductive dispersive layer and said stud base making direct electrical contact with said upper surface of said conductive dispersive layer;

a layer of facestock having a adhesive coated undersurface being adhered to the upper surface of said conductive dispersive layer, said facestock having an aperture therein larger in dimensions than said stud base said stud base being entirely within said aperture, and said stud post projecting from said aperture in said facestock whereby the material of said facestock does not interfere with direct electrical contact between said conductive stud base and said conductive dispersive layer;

said facestock being larger in dimensions than said conductive dispersive layer;

a gel layer adhered to and completely covering the lower surface of said eyelet base and the lower surface of said conductive dispersive layer.

4,926,879

ELECTRO-TACTILE STIMULATOR

Christophe Jean-Paul Sevrain, Fitchburg, Wis.; Heather R. Schramm, Minneapolis, Minn.; Daniel G. Schmidt, Dane, Wis.; Paul S. Hooper, Stoughton, Wis., and Mary P. Thomas, Madison, Wis., assignors to Sevrain-Tech, Inc., Madison, Wis.

Continuation-in-part of Ser. No. 205,919, Jun. 13, 1988, abandoned. This application Sep. 12, 1989, Ser. No. 406,192
Int. Cl.[5] A61N *1/02, 1/36*
U.S. Cl. 128—798 **21 Claims**

1. A cutaneous stimulator for applying electricity to the skin of a user comprising:

a flexible substrate upon one surface of which is formed a printed circuit pattern, the pattern including a plurality of electrodes and conductors connected to the electrodes;

an insulating layer contiguous with the one surface of said substrate and having a plurality of apertures each of which is aligned with one of said electrodes; and

an electrically conductive layer contiguous with said insulating layer and having a plurality of apertures therethrough each one of which being aligned with a different one of said electrodes.

13. A cutaneous stimulator for applying electricity to the skin of a user comprising:

a substrate;

a plurality of first electrodes on said substrate;

a second electrode surrounding each of said first electrodes and electrically isolated therefrom;

means for applying to each of said first electrodes, a first charge pulse of one polarity followed by a second charge pulse of the opposite polarity, the absolute magnitude of the pulses of each polarity applied to a given electrode being unequal by a given amount so that the pH of the skin remains substantially unchanged by the application of the pulses to the electrodes.

4,926,880

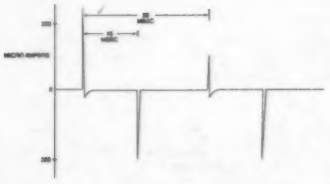
METHOD FOR RELIEVING SINUS AND NASAL CONGESTION UTILIZING MICROCURRENTS

John P. Claude, Redwood City, and Stephen L. Young, San Mateo, both of Calif., assignors to Microcurrents, Redwood City, Calif.

Filed Nov. 8, 1988, Ser. No. 268,597

Int. Cl.[5] A61N *1/00*

U.S. Cl. 128—800 **17 Claims**



1. A method for relieving sinus and nasal congestion, the method comprising the steps of:

generating periodically repeating microcurrent excursions;

applying said microcurrent excursions to a patient's face adjacent the patient'nasal area; and

generating a perceptible signal when said microcurrent excursions are being applied to a low impedance region of said patient's face;

whereby, when said microcurrent excursions are applied to low impedance regions of a patient's face adjacent the nasal area, said microcurrent excursions relieve the patient's sinus and nasal congestion.

4,926,881

PORTABLE BATTERY POWERED ELECTROMAGNETIC THERAPY APPLICATOR

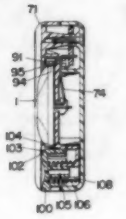
Tsutomu Ichinomiya; Tomohiro Kami, both of Hikone; Fumio Kitagawa, Neyagawa; Sumio Wada, Hikone; Hideaki Abe, Moriguchi; Youichi Ise, Hirakata, and Toshio Kusunoki, Hikone, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Apr. 7, 1988, Ser. No. 178,583

Claims priority, application Japan, Jun. 15, 1987, 62-148534

Int. Cl.[5] A61N *1/40*

U.S. Cl. 128—804 **19 Claims**



1. A portable diathermy apparatus comprising in combination a battery powered applicator for applying a high frequency electromagnetic field to a living tissue and a charger unit for recharging said applicator;

said applicator adapted in use to be attached to the skin of a patient and comprising:

an oscillator for producing the high frequency electromagnetic field;

an antenna connected to be energized by said oscillator to transmit the electromagnetic field to the tissue;

a rechargeable battery electrically connected for driving the oscillator;

a casing encapsulating therein electronic components forming said oscillator together with said antenna and said rechargeable battery, and

electrodes connected to said rechargeable battery and exposed on the exterior of said casing;

said charger unit comprising a recess and a source of electric power connected to said applicator when the applicator is received in said recess therein, said recess having charging terminals for electrical connection respectively with the electrodes of said applicator when received in said recess for recharging the battery of said applicator from said source of electric power.

4,926,882

TRANSPARENT SHIELDING DEVICE FOR USE WITH AUTOPSY SAW

Sharon K. Lawrence, 789 Bayard St., Teaneck, N.J. 07666

Filed Sep. 6, 1988, Ser. No. 240,694

Int. Cl.[5] A61F *13/00*

U.S. Cl. 128—850 **9 Claims**

1. A protective shield and saw assembly for use during an autopsy by a prosector operating upon a subject comprising, in combination:

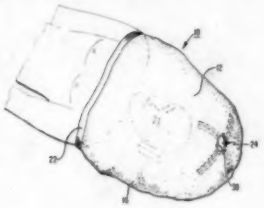
a transparent shield for attachment to and for draping about said subject, said shield having an inside and an outside face and, when said shield is draped about said subject, the inside face is adjacent said subject;

one or more attachment means for sealing said body to the subject, said attachment means for isolating the portion of said subject to be dissected and for defining a sealed dissection chamber thereabout;

at least one autopsy instrument port means for inserting an oscillating autopsy saw partly into said chamber with the handle thereof adjacent the outside face of said body; and,

an instrument seal means for sealing said port means to said saw;

an oscillating autopsy saw mounted with the blade portion in the dissection chamber and the instrument seal means sealed to the shank of the saw;



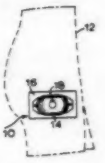
whereby the prosector, when the protective shield and saw assembly is employed, is enabled to use with an unobstructed view thereof, said oscillating autopsy saw upon said subject while restricting the effluent from the dissection of the subject to said sealed dissection chamber and thereby protecting the prosector from infection.

4,926,883

PROTECTIVE BODY APPLIANCE

Alvin E. Strock, 647 Commonwealth Ave., Newton Center, Mass. 02159

Filed Jun. 2, 1988, Ser. No. 201,170
Int. Cl.[5] A61F *13/00*
U.S. Cl. 128—888 **14 Claims**



1. A protective body appliance to be secured to a wearer, comprising:

a pad formed from a relatively flexible, relatively compressible material having a first section and a second section, said second section having a surface for positioning against the wearer, and including a pair of opposed end wing portions that are flexible relative to said first pad section when said second section is adhered to the wearer;

means for adhering said second pad section surface to the wearer; and

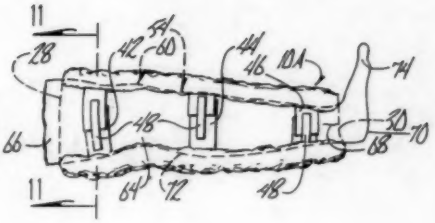
a relatively rigid shield having opposed ends secured to said first pad section so that a central portion of the shield is raised above said pad and so that said shield is permitted a limited degree of rocking movement relative to wing portions of said second pad section when said second pad section surface is adhered to the wearer, said shield being adapted to absorb and disperse forces applied thereto, transferring such forces to areas spaced away from said central portion of said shield.

4,926,884

METHOD AND MEANS FOR PREVENTING SKIN ABRASIONS FOR PATIENTS HAVING LEGS SUBSTANTIALLY LOCKED IN JUXTAPOSITION

Robert Lonardo, Treasure Island, Fla., assignor to L'Nard Associates, Inc., St. Petersburg, Fla.

Continuation-in-part of Ser. No. 107,980, Oct. 14, 1987, abandoned. This application Oct. 7, 1988, Ser. No. 255,013
Int. Cl.[5] A61B *19/00*
U.S. Cl. 128—892 **10 Claims**



1. A pad for preventing skin abrasions and the like for use between the legs of patients whose legs are substantially positioned in overlapping condition, comprising, a flexible planar pad having an interior compartment and having a

top, a bottom, side edges, and opposite leg engaging surfaces, including surfaces to permit simultaneous engagement with opposed heels, ankles, or knees of said patient,

a first pair of spaced substantially vertical slots adjacent the top of one of said leg engaging surfaces,

a second pair of spaced substantially vertical slots adjacent the bottom of said one of said leg engaging surfaces,

said leg engaging surfaces comprising a soft resilient material so that the skin and flesh of the inner portion of a patient's legs will be protected from abrasive friction when said pad is placed between the legs of a patient whose legs are subtantially locked together in overlapping condition, whereby the pressure exerted by the weight of one leg on the other can be equalized, and the pressure points between heels, ankles and knees of the patient can be relieved when said heels, ankles or knees are in overlapping condition,

first strap means, having a center portion and opposite end portions, threaded through said first pair of vertical slots so that the center portion thereof dwells within said interior compartment and said end portions thereof extend over said side edges to be joined on the side of said patient's leg opposite to said center portion thereof, for securing said pad to a patient's leg above the knee,

and a second strap means, having a center portion and opposite end portions, threaded through said first pair of vertical slots so that the center portion thereof dwells within said interior compartment and said end portions thereof extend over said side edges to be joined on the side of said patient's leg opposite to said center portion thereof, for securing said pad to a patient's leg above the ankle,

said first and second strap means being capable of pulling said pad into engagement with a patient's leg as the end portions thereof extend over said side edges and are joined, respectively, on the side of a patient's leg opposite to said pad so that said pad will conform to the shape of the patient's leg.

4,926,885

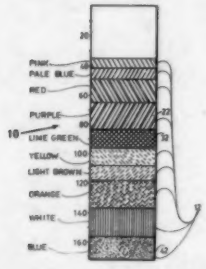
METHOD OF SELECTING MEDICATION AND MEDICAL EQUIPMENT

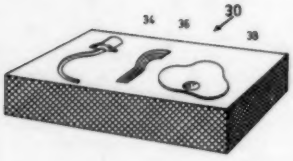
Allen J. Hinkle, Box 451, Hardy Hill Rd., Lebanon, N.H. 03766

Filed Feb. 22, 1988, Ser. No. 158,548

Int. Cl.[5] G01B 3/02

U.S. Cl. 128—898 **11 Claims**





1. A method for selecting medication and medical equipment for a patient comprising the steps of:

preparing series of packages based on anatomical dimensions, each of said packages containing a group of elements which correlated to an anatomical dimension;

coding said packages to correlate with said anatomical dimension;

determining said anatomical dimension of a patient;

correlating said anatomical dimension of said patient to said code; and

selecting from said packages a package with said correlated code.

4,926,886

METHOD OF AND APPARATUS FOR MAKING A TRIMMED STREAM OF TOBACCO FIBERS OR THE LIKE

Heinz-Christen Lorenzen, Wentorf; Uwe Heitmann; Wolfgang Siems, both of Hamburg, and Peter Pinck, Gross-Hansdorf, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

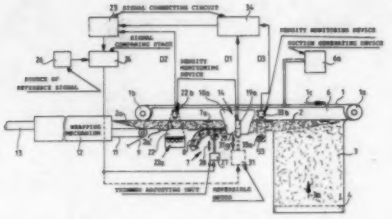
Filed Jul. 28, 1988, Ser. No. 225,694

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725365

Int. Cl.[5] A24C 5/18

U.S. Cl. 131—84.4 **20 Claims**

1. A method of making and trimming a stream of fibers of smokable material or filter material for tobacco smoke, comprising the steps of establishing and elongated substantially horizontal path; supplying fibers into a first portion of the path to form a continuous stream which contains a surplus of fibers; advancing the stream along the path in a predetermined direction; removing the surplus from the stream in a second portion of the path downstream of the first portion to thus convert the stream into a filler; monitoring the density of portions of predetermined height of successive increments of the stream between the first and second portions of the path, including directing against the stream at least one beam of radiation whereby some of the radiation penetrates through the stream and is indicative of the density of corresponding increments of the stream, and generating density signals denoting the intensity of radiation which penetrates through the stream; regulating said surplus removing step in response to said density



signals; monitoring the density of successive increments of the filler downstream of the second portion of said path, including generating second signals which are indicative of monitored density of the filler; and utilizing said second signals to modify the corresponding density signals so as to compensate, when necessary, for the influence of differences between said predetermined height and the height of the filler.

4,926,887

APPARATUS FOR MANIPULATING ROD-SHAPED ARTICLES

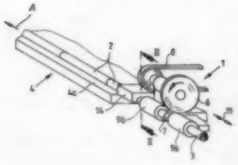
Jochim Myohl, Wentorf, and Alfred Kasparek, Hamburg, both of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Dec. 29, 1988, Ser. No. 291,511

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, 3800431

Int. Cl.[5] A24C 5/28

U.S. Cl. 131—91 **9 Claims**



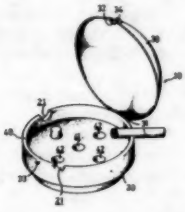
1. Apparatus for manipulating a series of rod-shaped articles which move axially, particularly for manipulating rod-shaped articles of the tobacco processing industry which are severed from a moving continuous rod, comprising a guide having a channel defining for the articles of the series an elongated path which is open at one side and which the articles tend to leave when moving at an elevated speed, said path having an article-receiving end and said open side being the upper side of said path; and means for stabilizing the articles in said path, including a stabilizing element disposed at a level above the article-receiving end of said path and arranged to at least reduce the tendency of the articles to leave said path while moving longitudinally at said elevated speed.

4,926,888

DISPOSABLE ASHTRAY

Chin-Ching Lee, No. 10, Lane Nan-E, Ch'ang-shou Rd., Feng-Yuan City, Tai-Chung Hsien, Taiwan

Filed Nov. 21, 1988, Ser. No. 274,359
Int. Cl.[5] A24F *19/00, 19/14*
U.S. Cl. 131—236 1 Claim



1. In a disposable ashtray having a cover hinged to an ashtray body, which is substantially closable by the cover, an improved insert therefor comprising:

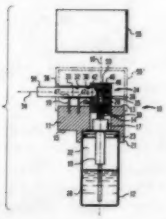
a molded block disposed within the ashtray body, said block being formed of a high molecular hydrophilic polymer and having an upper surface thereof including a plurality of holes formed therein for accommodating an increase in the volume of said block when said block expands when absorbing water, said holes being constructed and arranged to prevent said upper surface from becoming domed during such expansion, said holes also being sized to accommodate a cigarette butt therein for providing an extinguishing means for the cigarette when the cigarette is inserted into one of said holes.

4,926,889

APPARATUS FOR TREATING TOBACCO PRODUCTS

George E. Brackett, 9897 Treasure Cay Ln., Bonita Springs, Fla. 33923

Continuation-in-part of Ser. No. 940,063, Dec. 10, 1986. This application May 19, 1988, Ser. No. 195,965
Int. Cl.[5] A61K *13/00, 13/08*
U.S. Cl. 131—329 27 Claims



1. Apparatus for treating tobacco products, comprising:

(a) a body member;

(b) a push button member movable relative to said body member between an actuated position and a deactuated position;

(c) means for supporting a tobacco product on one of said members;

(d) means carried by one of said members for puncturing the sidewall of said tobacco product; and

(e) means responsive to movement of said push button member to its actuated position for supplying a moistening liquid to said tobacco product.

4,926,890

COMPOSITION AND METHOD FOR ENHANCING FINGERNAILS

Margaret E. Hoskins, 2230 Homestead Ct., #211, Los Altos, Calif. 94022

Filed Mar. 16, 1988, Ser. No. 168,855
Int. Cl.[5] A45D *29/00*
U.S. Cl. 132—73 11 Claims

1. A dry powder product suitable for application to a layer of cosmetically acceptable adhesive for strengthening or extending fingernails, which powder product comprises:

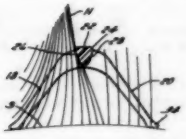
base-treated, dried, powdered bone, having a particle size between about 230 mesh and about 325 mesh.

4,926,891

HAIR CUTTING GUIDE

Frank P. Fani, 401 71st St., Kenosha, Wis. 53140, and Frank Mikic, 3329 99th St., Kenosha, Wis. 53142

Continuation of Ser. No. 165,589, Mar. 8, 1988, abandoned. This application Sep. 5, 1989, Ser. No. 403,787
Int. Cl.[5] A45D *24/36*
U.S. Cl. 132—214 6 Claims



1. A hair cutting guide comprising:

a plurality of parallel spaced-apart segments, each of said segments comprising a pair of legs having longitudinal axes formed along intersecting planes such that each of said segments has a generally triangular shape in cross-section; and

connecting means being of generally triangular shape in cross-section including a top surface having a longitudinal axis, for linking said segments along a top portion thereof to produce a generally unitary structure having a predetermined height, said height measured from said top surface between said segments along a line perpendicular to a plane defined by distal ends of a pair of said legs in said segments, said top surface having means for defining a cutting plane lying generally parallel to the plane defined by distal ends of said legs; and

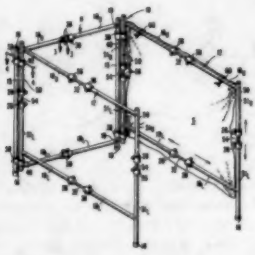
said connecting means further having a pair of side walls associated with said top surface and each defining along the longitudinal axis a surface of a groove between pairs of legs in adjacent segments whereby hair is captured in said grooves against said side walls and is cut along the longitudinal axis of said top surface in the plane defined by said top surface.

4,926,892

TEMPORARY ENCLOSURE STRUCTURE

Daniel T. Osmonson, Fountain Hills, Ariz., and James L. McNulty, North Vernon, Ind., assignors to Krohm, Inc., Columbus, Ind.

Filed Nov. 15, 1989, Ser. No. 436,593
Int. Cl.[5] E04H *15/38*
U.S. Cl. 135—103 **10 Claims**



1. A temporary enclosure structure comprising:
a rear frame section, including;
a pair of spaced apart tubular vertical support members;
a first pair of extensible tubular horizontal members;
means for attaching each of said first pair of extensible horizontal members between said pair of vertical support members in spaced apart relation to define a generally planar frame;
a side frame section, including;
a pair of spaced apart extensible tubular vertical members;
a second pair of extensible tubular horizontal members;
second means for attaching each of said second pair of extensible horizontal members between said pair of extensible vertical members in spaced apart relation to define a generally planar frame; and
a pair of frame supports engaged on said rear frame section for supporting said side frame section, each of said pair of frame supports being in vertical spaced apart relation and including;
a rear pipe section concentrically disposed about one of said pair of vertical support members of said rear frame section;
a forward pipe section integral with said rear pipe section, concentrically disposed about one of said pair of extensible vertical members of said side frame section, wherein said one vertical member is slidable within to said forward pipe section; and
a removable fastener for connecting said rear pipe section to said one of said pair of vertical support members of said rear frame section.

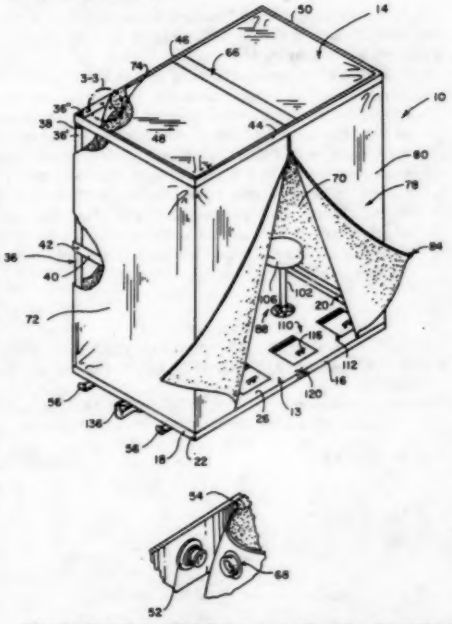
4,926,893

PORTABLE, COLLAPSIBLE ICE FISHING SHELTER

Rick Klopfenstein, and Tom Kreitzer, both of 203 E. State St., Botkins, Ohio 45306

Filed Jun. 13, 1989, Ser. No. 365,604
Int. Cl.[5] E04H *15/44*
U.S. Cl. 135—106 **6 Claims**

1. A portable, collapsible ice fishing shelter comprising:
(A) a frame assembly which includes
(1) a rectangular base which includes sides and ends which intersect said sides to form corners,
(2) a support block located at each of said corners and each including
(a) orthogonally arranged side faces,
(b) a groove defined in two adjacent side faces, with said grooves intersecting to form an L-shaped guide that extends for essentially the entire length of said block and to extend vertically upward from said frame assembly base when said block is affixed to said base,
(3) a plurality of vertical L-shaped supports each attached at one end to one of said blocks adjacent to said guide and extending vertically upward from said base,
(4) a plurality of cross supports, each connecting adjacent vertical supports together at a location that is vertically spaced from said base,
(5) a plurality of horizontal top elements, each attached to another end of said vertical supports and extending horizontally at a location vertically spaced from said base,
(6) frame assembly snap fastener elements on said base and on said top elements, and
(7) a plurality of ski-like runners mounted on said base to be parallel to said base sides and to each other;
(B) a unitary covering assembly including
(1) a top section,
(2) a rear section,
(3) side sections, and



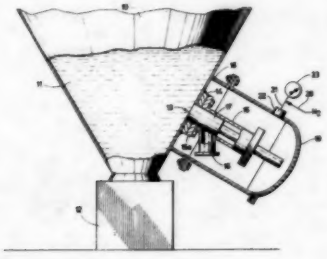
(4) a front section which has two panels and a zipper for securing said panels together, and
(5) snap fastener elements which cooperate with said frame assembly snap fastener elements and secure said unitary covering assembly to said frame assembly;
(6) a seat assembly which includes
(1) a plurality of spaced apart seat brace elements mounted on said frame assembly base,
(2) a seat member releasably coupled to each seat brace and including
(a) a support post releasably coupled to said seat brace, and
(b) a seat element attached to said post; and (D) a fishing opening assembly which includes
(1) a plurality of spaced apart openings defined through said frame assembly base,
(2) a cover hingeably connected to said frame assembly base adjacent to each opening and each including a handle.

4,926,894

APPARATUS AND METHOD FOR DRAINING A VISCOUS MATERIAL FROM A VESSEL

Gaylon L. Dighton, Baton Rouge, La., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 13, 1989, Ser. No. 434,395
Int. Cl.[5] F16L 55/18
U.S. Cl. 137—15 5 Claims



2. The method of claim 1 which includes the steps of:

removing the valve actuator means from the valve body after the piston has been moved into the closed position; and

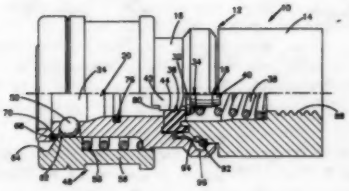
attaching the dome section to the base section, to thereby provide the housing assembly which encloses the valve unit.

4,926,895

SOCKET ASSEMBLY

Edward D. Gailey, Mentor, Ohio, assignor to Tuthill Corporation, Cleveland, Ohio

Filed Jul. 7, 1989, Ser. No. 376,761
Int. Cl.[5] F16L 37/28
U.S. Cl. 137—15 8 Claims



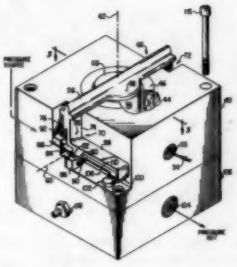
1. A method comprising the steps of providing a first socket part having an outwardly opening groove, providing a second socket part having an inwardly opening groove, providing a resilient retainer ring, telescopically positioning the retainer ring on an end portion of the first socket part at a location axially offset from the groove in the first socket part, engaging the grooves in the first and second socket parts with the retainer ring by pressing against the retainer ring with the second socket part to move the retainer ring axially toward the groove in the first socket part and resiliently expanding the retainer ring under the influence of force applied against an inner side area of the retainer ring by the first socket part as the retainer ring moves axially toward the groove in the first socket part, thereafter, inserting a plug into a socket chamber which is at least partially formed by one of the socket parts, and retaining the first and second socket parts against movement relative to each other by abutting engagement of surfaces of the grooves in the first and second socket parts with the retainer ring when the plug is in the socket chamber.

4,926,896

SENSITIVE ELECTRICAL TO MECHANICAL TRANSDUCER

Robert C. Prescott, N. Marshfield, Mass., and Robert J. Robinson, Derry, N.H., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 23, 1988, Ser. No. 289,224
Int. Cl.[5] G05D 16/00; H01F 7/14
U.S. Cl. 137—82 84 Claims



1. An electrical to mechanical transducer, comprising:

a coil winding adapted for carrying a current to provide a magnetic field, said winding being wound so as to define an opening having an axis coaxial with magnetic flux lines of the magnetic field;

a high energy magnetic material having an energy greater than about 30,000,000 gauss-oersted, disposed in the opening of said winding, and of the type which is moved in response to the magnetic field generated by said winding, said magnet being disposed in said coil winding opening such that the polarization thereof is orthogonal to the magnetic flux lines; and

a coupling arm connected to said magnetic material and movable in response to the movement of said magnetic material to provide a mechanical output of said transducer.

4,926,897

AUTOMATIC FLUID PRESSURE EQUALIZING VALVE

Charles H. Perrott, Portland, Oreg., assignor to C. H. Perrott, Inc., Portland, Oreg.

Filed Jun. 12, 1989, Ser. No. 364,140
Int. Cl.[5] G05D 7/01
U.S. Cl. 137—98 3 Claims

1. A valve assembly comprising:

(a) a unitary valve body 10 apertured to provide a central axial cavity open at one end,

(b) a sleeve 18 disposed within the cavity and substantially coextensive therewith,

(c) the valve body having a recess 19 in its closed end closely accommodating the adjacent end of the sleeve,

(d) the valve body further having hot and cold water inlet and outlet passages 13, 16 and 14, 17,

(e) the sleeve having ports 26, 27, and 28, 29 providing fluid communication between the hot water inlet and outlet passages 14, 17 and between the cold water inlet and outlet passages 13, 16 respectively,

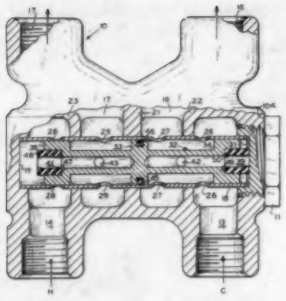
(f) a pressure balancing piston 32 disposed for movement within the sleeve and having a central land 33 and terminal lands 34, 36,

(g) the piston also having axially internal bores 39, 41 which terminate at their inner ends substantially at the central

land 33 and at their outer ends in segments 47, 49 of enlarged diameter,

(h) the piston having also apertures 42, 43 communicating the bores with the interior of the sleeve,

(i) the terminal lands 34, 36 being contoured and dimensioned to serve as closure means to inversely obstruct the sleeve ports between the hot water inlet and outlet passages and the sleeve ports between the cold water inlet



and outlet passages in response to a variation in the ratio of fluid pressures in the inlet passages,

(j) longitudinally perforated compressible pads 48, 50 mounted in axial bores 39, 41 of the piston, the perforations of the pads communicating with the said bores of the pistons,

(k) and a plug 11 threaded into the valve body for closing the open end of the body cavity and the adjacent end of the sleeve.

4,926,898

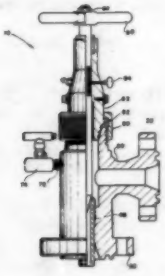
SAFETY CHOKE VALVE

Ted J. Sampey, P.O. Box 877, Belle Chasse, La. 70037

Filed Oct. 23, 1989, Ser. No. 425,485

Int. Cl.[5] F16K *43/00, 51/00*

U.S. Cl. 137—315 **30 Claims**



1. A safety choke comprising:

a valve body having an inlet fluid flow passage and an outlet fluid flow passage arranged at a right angle to said inlet flow passage, the valve body being provided with a frustoconical cavity in a valve body top portion;

a bonnet means having a frustoconical lower part matingly tapered to fit in a seated engagement within said cavity; and

means for securing position of said bonnet means on said valve body, said bonnet being partially manually disengaged from said valve body to cause breaking of the seated engagement, so as to determine, by at least partial relief of pressure build up between the valve body and the bonnet, if an excessive pressure exists in the valve body, wherein when the excessive pressure is above a predetermined level said bonnet is prevented from being manually unseated thereby alerting an operator to relieve the pressure through an alternative pressure relief means.

4,926,899

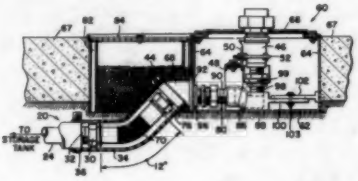
TRANSITION CONDUIT SYSTEM FOR FUEL PUMP

Toby Argandona, 21221 Running Branch Rd., Diamond Bar, Calif. 91765

Filed Sep. 19, 1989, Ser. No. 409,080

Int. Cl.[5] F16L *5/00*

U.S. Cl. 137—364 **22 Claims**



1. A transition conduit system for a fuel pumping unit, comprising:

a casing disposed in a base for a fuel pumping unit, said casing comprising a bottom wall and upstanding side walls for containing spilled fuel,

a vertically oriented flow valve in the upper section of the casing,

a first acute-angle elbow passage means on one of said casing side walls to position a first outlet leg of the elbow passage to extend horizontally through said one casing side wall, and to position a second inlet leg of the elbow passage to extend at an acute downward angle relative to the first leg,

an L-shaped passage means in the casing and extending between the horizontal leg of said elbow passage means and the vertically oriented flow valve, and

a second elbow passage means joined to the second leg of the first elbow passage means, the second elbow passage means including a first upwardly inclined outlet passage section connected to the inlet leg of the first elbow passage means and a second inlet passage section extending essentially horizontally with the second elbow joined to the first elbow.

4,926,900

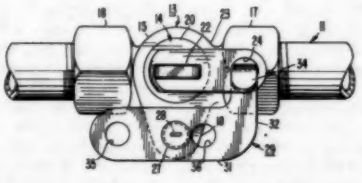
VALVE ASSEMBLY AND LOCKING MEANS THEREFOR

Eugene E. Pietras, Liverpool, N.Y., assignor to Niagara Mohawk Power Corporation, Syracuse, N.Y.

Filed May 16, 1989, Ser. No. 352,295

Int. Cl.[5] F16K *35/00*

U.S. Cl. 137—385 **36 Claims**



1. A valve assembly comprising:

a valve having a housing provided with inlet and outlet ports and a valve element disposed in said housing and movable

between closed and open positions, said valve element having a wing portion provided with an opening therein movable between a first position when said valve element is in the closed position and a second position when said valve element is in the open position, said housing having a wing portion provided with an opening therein disposed in lockable relation with said valve element wing portion when said valve element is in said first position;

a rigid spacer member disposable between said housing and valve element wing portions when said valve element is in the open position and said valve element wing portion is in said second position;

a barrel lock removably mountable in registered openings of said wing portions when said valve element wing portion is in said first position and said valve element is in the closed position whereby said valve element will be locked in the closed position; and

said rigid spacer member having a hook portion cooperable with the opening in said valve element wing portion, and an opening spaced from said hook portion and registrable with the opening in said housing wing portion for removably mounting said barrel lock in said registered openings when said valve element wing portion is in the second position and said valve element is in the open position whereby said valve element will be locked in the open position.

4,926,901

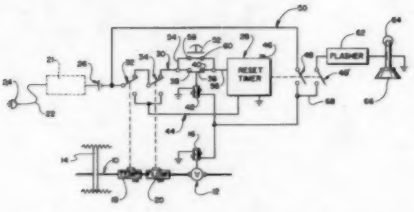
FLUID SUPPLY LINE FLOW CONTROL DEVICE

Harold D. Waltenburg, 11754 Woodbine St., N. W., Coon Rapids, Minn. 55433

Filed Jun. 28, 1989, Ser. No. 372,668

Int. Cl.[5] F16K *17/00*

U.S. Cl. 137—456 **5 Claims**



1. Apparatus for automatically terminating flow through a fluid supply line in response to continuous flow through the line for a period greater than a defined time, comprising:

(a) a normally-open control valve in the supply line;

(b) a sensor in the supply line, up-flow of said control valve, for ascertaining flow of fluid through the supply line;

(c) power means;

(d) timing means actuatable by said power means, said time means operational in reset, timing, and trip modes;

(e) a normally-closed reset circuit having a first two-position switch therein, said switch normally being in a first position thereof to provide power from said power means to maintain said timing means in said reset mode thereof, and said switch being responsive to said sensor to move to a second position thereof when flow of fluid through the supply line is ascertained;

(f) a normally-open initiation circuit, closable by said two-position switch when it has been moved to said second position, to provide power from said power means to initiate said timing means in said timing mode thereof;

(g) a normally-open control circuit having a second two-position switch therein, said second two-position switch normally being in a first, open position to maintain said control circuit open, and said second two-position switch being responsive to said timing means, when said timing means, after a predetermined period of time after entering said timing mode thereof, is automatically initiated in said trip mode thereof, to be moved by said timing means to said second two-position switch's second position to close said control circuit and provide power from said power means to said normally-open control valve, to close said valve; and

(h) means, actuatable when said control circuit is closed, for opening said reset circuit.

4,926,902

PRESSURE EQUALIZER VALVE DEVICE OF FUEL INJECTION PUMP

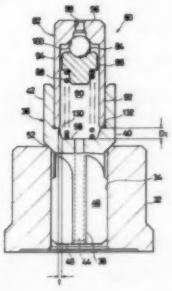
Hisashi Nakamura; Satoshi Takahashi; Takayuki Ikeda, and Masaaki Ogino, all of Saitama, Japan, assignors to Diesel Kiki Co., Ltd., Japan

Filed Jan. 17, 1989, Ser. No. 298,104

Claims priority, application Japan, Jan. 18, 1988, 63-3821[U]; Jul. 4, 1988, 63-165049; Nov. 14, 1988, 63-14758[U]; Nov. 14, 1988, 63-285734

Int. Cl.[5] F16K *17/18*

U.S. Cl. 137—493.3 **23 Claims**



1. A pressure equalizer valve device incorporated in a fuel delivery valve assembly for use in a fuel injection pump, the fuel delivery valve assembly having a valve chamber and a delivery valve member axially movable in part within the valve chamber, the delivery valve member having an axially elongated concavity which is open at one end of the delivery valve member, the pressure equalizer valve device comprising

(a) a hollow equalizer valve casing member which has an axial end portion closely received in said axially elongated concavity and which is thereby fixedly secured to said delivery valve member, said casing member having a valve seat surface portion and a valve chamber open in said delivery valve member,

(b) an equalizer valve element movable into and out of a position seated on said valve seat surface portion, and

(c) biasing means engaging said equalizer valve element and located in part within said delivery valve member for urging said equalizer valve element against said valve seat surface portion of said equalizer valve casing member,

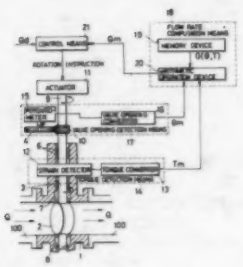
(d) wherein said equalizer valve element and at least a portion of said biasing means are accommodated within the valve chamber in said equalizer valve casing member.

4,926,903

BUTTERFLY VALVE HAVING A FUNCTION FOR MEASURING A FLOW RATE AND METHOD OF MEASURING A FLOW RATE WITH A BUTTERFLY VALVE

Kouzi Kawai, Higashi-Osaka, Japan, assignor to Tomoe Technical Research Company, Japan

Filed May 5, 1989, Ser. No. 347,621
Int. Cl.[5] G01F *1/28*; F16K *37/00*
U.S. Cl. 137—554 **16 Claims**



10. A method of measuring a flow rate of a fluid flowing through a butterfly valve, comprising the steps of;

detecting a valve opening of said butterfly valve,

detecting a dynamic torque applied to a valve member of said butterfly valve around a valve shaft of said butterfly valve by said fluid, and

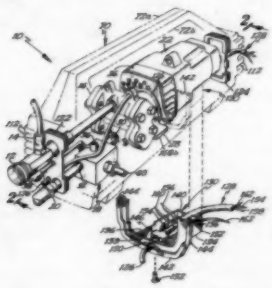
determining said flow rate as a function of said detected valve opening and said detected dynamic torque.

4,926,904

PRESSURE WASHER

Gary C. Polk, Eden Prairie; Steve A. Larson, Stacy, and Ronald E. Albrecht, Crystal, all of Minn., assignors to Power Flo Products Corp., Minneapolis, Minn.

Division of Ser. No. 229,832, Aug. 8, 1988, Pat. No. 4,851,724. This application Jun. 12, 1989, Ser. No. 364,178
Int. Cl.[5] F04B *21/00*
U.S. Cl. 137—565 **13 Claims**



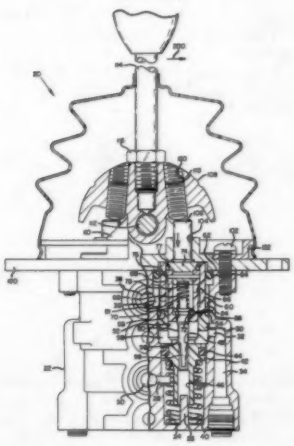
1. Housing for an internal component including a first end having a shape and a second end having a shape, with the shapes of the first and second ends of the internal component being of different sizes and shapes, comprising, in combination: a first housing half having a first end, a second end, and an inner surface defining an interior; a second housing half having a first end, a second end, and an inner surface defining an interior, with the first end of the first housing half being interconnected to the second end of the second housing half and the second end of the first housing half being interconnected to the first end of the second housing half, with the first housing half being identical to the second housing half, with the first and second housing halves each including first and second ribs extending from the inner surface and equidistant and on opposite sides of the center of the housing half between the first and second ends, with the first rib of the first housing half and the second rib of the second housing half engaging the first end of the internal component and the second rib of the first housing half and the first rib of the second housing half being in a noninterfering relation with the second end of the internal component; and third and fourth ribs extending from the inner surface and equidistant and on opposite sides of the center of the housing half between the first and second ends, with the fourth rib of the first housing half and the third rib of the second housing half engaging the second end of the internal component and the third rib of the first housing half and the fourth rib of the second housing half being in a noninterfering relation with the first end of the internal component.

4,926,905

MANUALLY OPERATED AIR VALVE AND ACTUATOR IN COMBINATION CONTROL A HYDRAULIC SPOOL VALVE FOR MANEUVERING HEAVY EQUIPMENT

Jim Helfenstein, Portland, Oreg., assignor to Williams Controls, Inc., Portland, Oreg.

Filed Sep. 29, 1989, Ser. No. 421,964
Int. Cl.[5] F15B *13/042*
U.S. Cl. 137—625.6 **4 Claims**



1. In combination, an air regulating controller valve having a regulating section, and an air operated actuator controlling a hydraulic valve for manual operator control of heavy equipment comprising;

said regulating section of the controller valve having a movable cartridge with an inlet orifice, a moveable first piston with an exhaust orifice, and a poppet protruding through the inlet orifice and into the exhaust orifice, said inlet orifice and exhaust orifice defining therebetween an air pressure chamber, a first spring means biasing the poppet into a closed position in the inlet orifice, a second spring means biasing the piston toward the poppet, and manual control means for selectively moving the movable cartridge toward the first piston whereby the poppet is urged to a closed position in the exhaust orifice and to an open position in the inlet orifice to thereby permit air from the cartridge to pass through the inlet orifice into the air pressure chamber until the biasing force of the second spring means is overcome by air pressure in the chamber to force retraction of the first piston and thereby allow the first spring means to move the poppet into closed position in the inlet orifice;

an actuator having a movable second piston, a conduit directing air pressure from the air pressure chamber in the regulating section to one side of the movable second piston urging a first directional movement thereof, and a third spring means resisting said first directional movement of the second piston, said moveable second piston having a defined distance of effective movement and said third spring means providing increasing resistance to said first directional movement of the second piston throughout said distance of effective movement;

said moveable first piston having a defined distance of effective movement and said second spring means providing increasing resistance to movement of the first piston throughout said distance of effective movement, said second spring means being matched to said third spring means whereby movement of the first piston along its defined distance of effective movement establishes air pressure in the conduit that generates a proportionate movement of the second piston along its defined distance of effective movement.

4,926,906

SPOOL VALVE

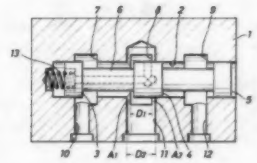
Kouji Ichihashi; Junichi Tani; Katsuhiko Tsukazaki; Hiroshi Sakuyama; Nobuo Baba; Kiyoji Nakajima; Takaaki Arai, and Akira Inaba, all of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jan. 30, 1989, Ser. No. 303,656

Claims priority, application Japan, Mar. 30, 1988, 63-74480

Int. Cl.[5] F15B *13/04*

U.S. Cl. 137—625.3 **12 Claims**



1. A spool valve comprising:

a valve housing having a valve bore extending in an axial direction therein, a control port extending therein and intersecting said valve bore so as to be open thereto at an opening of the control port, and a groove extending therein circumferentially of and open to said valve bore,

said opening having a diameter as taken transversely of said axial direction that is less than the diameter of said valve bore,

said groove being defined between inner peripheral surfaces of said valve housing which are spaced apart in and extend perpendicular to said axial direction, at least one of said inner peripheral surfaces lying in a plane intersecting said opening so that a segmental portion of said opening is disposed to one side of said groove in said axial direction, said segmental portion having a predetermined width as taken in said axial direction and defining thereover a control zone in the valve; and

a spool mounted to said valve housing within said valve bore so as to be slidable therein in said axial direction, said spool including a land having an outer circumferential surface complementary to and slidable over an inner peripheral surface of said valve housing defining said valve bore, said land having a width as taken in said axial direction that is at least equal to the maximum diameter of said opening of said control port as taken in said axial direction, and said spool being slidable within said valve bore between a position at which said land closes said control port to said valve bore and a position at which said control port is open to said valve bore via at least the segmental portion of the opening of said control port.

4,926,907

RELAY VALVE FOR PNEUMATIC OR HYDRAULIC APPLICATION

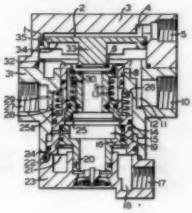
Gerhard Fauck, Hanover; Wolfgang Pohl, Garbsen, and Helmut Ulrich, Springe, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Continuation of Ser. No. 679,420, Dec. 7, 1984, abandoned. This application Feb. 12, 1986, Ser. No. 828,927

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1983, 3344841

Int. Cl.[5] F16K *21/00*

U.S. Cl. 137—627.5 **8 Claims**



1. A relay valve for a pneumatic brake installation for vehicles, comprising:

(a) an inlet valve having a first control connection which is in communication with a source of a first control pressure and having at least one supply connection which is in communication with a source of a supply pressure and which is put in communication with a source of at least one working connection;

(b) an outlet valve for connecting the working connection to the atmosphere;

(c) said inlet valve and said outlet valve being operated by a relay piston which is in communication with the first control pressure to move the inlet valve in an opening direction and to move the outlet valve in a closing direction, and being operated by the relay piston which is in communication with the working pressure supplied to a reaction chamber which is connected to the working connection to move the inlet valve in a closing direction and to move the outlet valve in an opening direction;

(d) graduated piston means located adjacent to the inlet and outlet valves for providing a graduated increase of the working pressure greater than the value corresponding to the first control pressure, up to the available supply pressure; and

(e) said graduated piston means is activated above a predetermined pressure value of a source of a second control pressure.

4,926,908

PRESSURE RELIEF AND VACUUM VENT VALVE

Otto Dschida, Stillman Valley, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 7, 1985, Ser. No. 795,879

Int. Cl.[5] F16K *24/00*

U.S. Cl. 137—846 **19 Claims**

1. A pressure relief and vacuum vent valve, comprising:

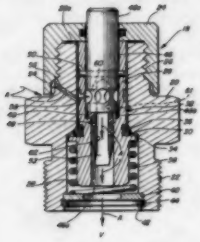
a valve body including means defining a valve seat;

a valve assembly positioned in the valve body and including a closure portion movable toward and away from the valve seat to close and open the valve;

biasing means for urging the valve assembly closure portion toward the valve seat to close the valve;

actuator means connected to the valve assembly for selectively moving the closure portion to open the valve and release pressure from within the valve body;

conduit means through the valve assembly and outwardly through the valve body; and



a flexible vent valve integral with the valve assembly and movable therewith in response to moving the actuator means, the flexible vent valve being located within the conduit means for venting fluid therethrough independently of the closure portion and biasing means only in response to vacuum within the valve body.

4,926,909

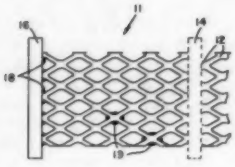
INTERSTICED NIPPLE FOR ELASTOMERIC HOSE

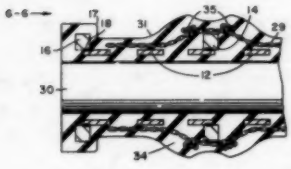
Philip Salinas, Aurora, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Continuation of Ser. No. 368,126, Jun. 16, 1989, abandoned, which is a continuation of Ser. No. 885,061, Jul. 14, 1986, abandoned. This application Jan. 2, 1990, Ser. No. 462,355

Int. Cl.[5] F16L *11/10*

U.S. Cl. 138—109 **12 Claims**





1. In a cured elastomeric hose and fitting assembly of the type with an elastomeric tube and joined together by a curing process, an elastomeric cover surrounding the tube, and the fitting with an annular nipple end bead attached near an end of a substantially cylindrically shaped nipple embedded in a terminus of the hose between a portion of the tube and cover, and wherein the improvement comprises:

the nipple of an expanded metal that defines a wall with a grid and a plurality of interstices with regularly repeating, substantially diamond shaped openings and which define a means for receiving viscoelastic flowby of a portion of the elastomeric tube and cover during said curing process and wherein the elastomer flowby is disposed in the interstices.

4,926,910

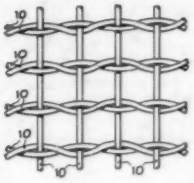
RADIO-FREQUENCY REFLECTIVE FABRIC

William D. Wade, San Jose, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Division of Ser. No. 123,843, Nov. 23, 1987. This application Aug. 22, 1988, Ser. No. 234,599

Int. Cl.[5] D03D *15/00*; D02G *3/12, 3/36*

U.S. Cl. 139—425 R **15 Claims**



1. A yarn for use in weaving a fabric that reflects radio-frequency electromagnetic energy, said yarn comprising a metallic filament and a non-metallic roving material, said roving material being wound around said metallic filament so as to form an electrically insulating covering for said metallic filament, said metallic filament having a diameter and said roving material having a density that are related to each other such that approximately half of any loading forces imposed upon said yarn by thermal stresses applied to the fabric woven from said yarn are accepted by said roving material, said filament and said roving material having corresponding coefficients of thermal expansion that are related to each other so that mechanical strain thermally induced in said metallic filament is substantially counteracted by mechanical strain thermally induced in said roving material as a result of thermal stresses applied to the fabric woven from said yarn at temperatures in a range extending from about −150° C. to about 100° C., said yarn thereby having an effective coefficient of thermal expansion of substantially zero over said range of temperatures.

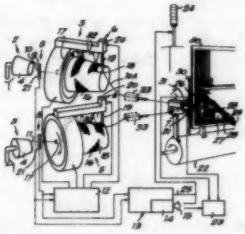
6. A fabric that reflects radio-frequency electromagnetic energy, said fabric having an effective coefficient of thermal expansion of substantially zero at temperatures in a range extending from about −150° C. to about 100° C., said fabric being woven from a yarn comprising a metallic filament and a non-metallic roving material, said roving material being wound around said metallic filament so as to form an electrically insulating covering for said metallic filament, said metallic filament having a diameter and said roving material having a density that are related to each other such that approximately half of any loading forces imposed upon said yarn by thermal stresses applied to said fabric are accepted by said roving material, said filament and said roving material having corresponding coefficients of thermal expansion that are related to each other so that mechanical strain thermally induced in said metallic filament is substantially counteracted by mechanical strain thermally induced in said roving material as a result of thermal stresses applied to said fabric at temperatures in said temperature range.

4,926,911

DETECTION AND STANDBY WEFT SUPPLY APPARATUS BREAK

Henry Shaw, Woesten-Vleteren, Belgium, assignor to Picanol N.V., Belgium

Filed Mar. 16, 1989, Ser. No. 324,000
Claims priority, application Belgium, Mar. 16, 1988, 8800300
Int. Cl.[5] D03D *47/34, 51/34*
U.S. Cl. 139—435.1 8 Claims



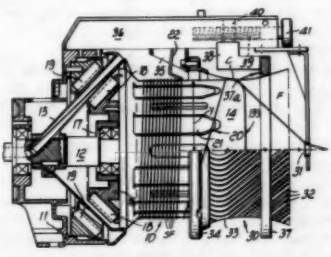
1. A weft thread supply for an airjet weaving machine, comprising: at least two thread preparation mechanisms, each including task performing means for performing the task of supplying weft thread to the shed of the weaving machine, each said task performing means including at least one thread package, a thread accumulator device, a thread stopping device, and a main nozzle; a detector arranged to detect thread breaks, which operates on at least one of respective thread packages and thread stopping devices; a control unit connected to the detector and to the thread preparation mechanisms and including means for, upon detection of a thread break by the detector, deactivating the thread preparation mechanism in which the thread break has occurred and transferring its task to the other thread preparation mechanism; and a monitoring device connected to the detector, said device including delay circuit means for supplying a delayed output signal for further processing by the control unit after the detector has detected a thread break.

4,926,912

WEFT FEEDING DRUM WITH LAMING ARRAY BRAKE

Pietro Zenoni, Leffe, Italy, assignor to L.G.L. Electronics S.p.A., Bergamo BG, Italy

Filed Feb. 21, 1989, Ser. No. 313,412
Claims priority, application Italy, Mar. 2, 1988, 67162 A/88; Jun. 14, 1988, 67559 A/88
Int. Cl.[5] D03D *47/34*
U.S. Cl. 139—452 12 Claims



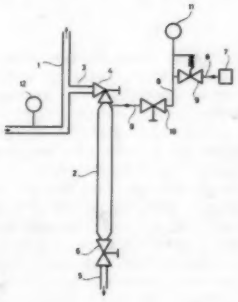
1. A weft feeding device, for looms, of the type comprising a drum for winding the thread and means for braking the thread which unwinds from the drum including an array of metallic laminas fitted on and tangent to the drum, wherein said array of laminas is arranged according to the surface of a rotational paraboloid, said paraboloid having a minimum-circumference radius, said paraboloid elastically engaging the thread at said own minimum-circumference radius; said paraboloid having one end rigidly coupled to a fixed supporting ring which encircles the drum and its other free end subject to the action of a movable ring which, when moved axially with respect to the paraboloid, varies curvature of said paraboloid to correspondingly vary the contact pressure of the laminas on the thread.

4,926,913

METHOD AND A DEVICE FOR ASEPTIC TRANSFER OF AN AMOUNT OF LIQUID FROM ONE SPACE TO ANOTHER

Bengt Palm, Genarp, Sweden, assignor to Alfa-Laval Food & Dairy Engineering AB, Tumba, Sweden

PCT No. PCT/SE87/00307, § 371 Date Dec. 29, 1988, § 102(e) Date Dec. 29, 1988, PCT Pub. No. WO88/00234, PCT Pub. Date Jan. 14, 1988
PCT Filed Jun. 29, 1987, Ser. No. 295,604
Claims priority, application Sweden, Jul. 4, 1986, 8602973
Int. Cl.[5] B65B *3/04, 31/00*
U.S. Cl. 141—1 6 Claims



1. A method of aseptically transferring liquid at a given pressure and temperature from a first space to a second space which comprises filling the second space with a sterile gas, having a condensation temperature, which, at said given pressure, is higher than the temperature of the liquid, to substantially the given pressure in the first space, bringing the first and second spaces into communication with one another, thereby causing the gas in the second space to be condensed by contact with the liquid and inducing the liquid to flow from the first space to the second space; and interrupting the communication between the first and second spaces so that the liquid in the second space is separated from the liquid remaining in the first space.

4,926,914

VENT CONTROL VALVE ATTACHED TO FUEL FILLER TUBE

Mitsuo Morizumi, Atsugi; Kinya Omura, Zama; Eriya Arita, Kawagoe; Katsuji Furuya, Tokyo; Sakae Yasuda, Kawagoe, and Masaya Kodera, Zama, all of Japan, assignors to Nissan Motor Company, Limited and Tsuchiya Mfg. Co., Ltd., both of, Japan

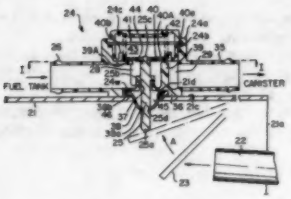
Filed Aug. 8, 1988, Ser. No. 229,423
Claims priority, application Japan, Aug. 10, 1987, 62-19931
Int. Cl.[5] B65B *31/00*
U.S. Cl. 141—59 16 Claims

1. A vent control system comprising:
a vapor storage canister;
a fuel tank;

a fuel filler tube communicating with the fuel tank and having an axis and a movable door; and

a vent control valve attached to the fuel filler tube and including

means for defining first and second chambers located side by side on a plane parallel to the fuel filler tube, said first chamber communicating with the fuel tank, said second chamber communicating with the vapor storage canister, and said chambers defining means including a partition wall extending generally perpendicular to the axis of the fuel filler tube wherein said first and second chambers are located on opposite sides of said partition wall and wherein said first and second chambers and said partition wall are generally coaxial with each other and



valve means adapted to cause said first and second chambers to communicate with each other so as to allow the fuel tank to communicate with the vapor storage canister, said valve means including a rod extending generally perpendicular to the axis of the fuel filler tube and having first and second end sections and a diaphragm member fixedly secured to the second end section of said rod, said rod and said diaphragm member being movable between a first position wherein said door is spaced from the first end section of said rod and said diaphragm member contacts said partition wall to block communication between said first and second chambers and a second position wherein said door is pushed against said first end section of said rod and said diaphragm member is separated from said partition wall to establish communication between said first and second chambers.

4,926,915

AMPUL

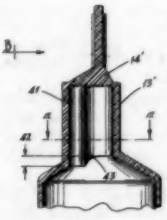
Heino Deussen, and Werner Deussen, both of Eltville, Fed. Rep. of Germany, assignors to Stella KG Werner Deussen, Eltville, Fed. Rep. of Germany

Filed Jul. 18, 1988, Ser. No. 220,593

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1988, 3818682

Int. Cl.[5] B65B *3/10*; A61J *1/06*

U.S. Cl. 141—290 **13 Claims**



1. A one-piece ampoule adapted to accommodate a dose of a liquid medium for transfer to a hypodermic syringe, said ampoule comprising a container and a tubular neck integral with the container, said neck comprising elastically ductile material and being constituted in the form of a push-on annular retainer means for encircling and directly engaging and sealing with the conical seating cone of a hypodermic syringe, which seating cone is intended to be later received in the cup of a hypodermic needle, said neck having a discharge opening therein and an integrally formed vent opening coextensive with said discharge opening but separated therefrom by an elongate wall common to both the said discharge opening and said vent opening, and an integral break-away cover normally sealing both said discharge opening and said vent opening, said integral cover having integrally formed manually engageable handle means to enable the cover to be forcibly broken away to simultaneously permanently uncover both said discharge opening and said vent opening of the ampoule, and to thereafter permit flow of the liquid medium out through the discharge opening while air can simultaneously flow into the ampoule through the separate vent opening.

4,926,916

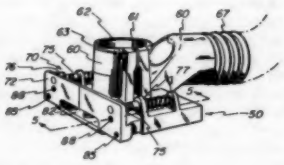
BISCUIT JOINER

John G. Legler, Huber Heights; Harold E. Folkerth, Dayton, and David D. Flora, Arcanum, all of Ohio, assignors to Shopsmith, Inc., Dayton, Ohio

Filed Aug. 10, 1989, Ser. No. 392,183

Int. Cl.[5] B27C *5/00*, *1/00*

U.S. Cl. 144—136 R **6 Claims**



1. Apparatus for cutting slots in wood workpieces to be joined by disk-like biscuits of predetermined dimensions inserted in such slots, comprising:

(a) a power tool including a frame and drive means mounted on said frame and having a drive spindle,

(b) a worktable mounted on said frame for relative adjustment toward and away from said drive means,

(c) a rotary saw blade drivingly connected with said spindle for rotation about a predetermined axis perpendicular to said worktable and fixed laterally with respect to said worktable,

(d) a housing mounted on said drive means in enclosing relation with said saw blade and open at the front thereof,

(e) said housing and said saw blade being so proportioned that in said mounted positions thereof on said drive means, said saw blade projects through said open front of said housing,

(f) means for effecting relative adjustment of said drive means and said worktable parallel with said axis to establish a predetermined space between said saw blade and said worktable,

(g) a guide for workpieces to be slotted having a face for engagement by each such workpiece,

(h) means mounted said guide on said housing at said open front thereof for linear movement toward and away from said saw blade,

(i) said guide having a slot therethrough aligned with and for receiving said saw blade therethrough,

(j) stop means establishing an outer limit position of said guide wherein said saw blade does not project beyond the plane of said guide face, and

(k) stop means for establishing an inner limit position of said guide establishing the maximum depth of the slot but by

said saw blade in a workpiece moved on said worktable with said guide to said inner limit position;

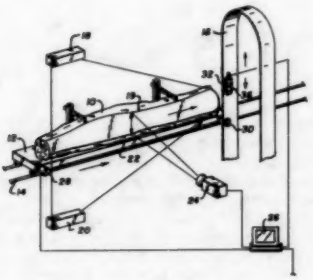
(1) whereby upon movement of said guide toward said housing by a workpiece listing on said worktable in engagement with said guide, said saw blade will cut a slot in said workpiece at the level determined by said means for effecting relative adjustment of said drive means and said worktable.

4,926,917

FEED SPEED AND GUIDE ARM CONTROL FOR SAWING LOGS

Eberhard Kirbach, 10260 Dennis Crescent, Richmond, British Columbia, Canada (V7A 3R8)

Filed Jul. 10, 1989, Ser. No. 377,096
Int. Cl.[5] B27B *1/00*
U.S. Cl. 144—356 **9 Claims**



1. A method of controlling feed speed of a log or cant while sawing with a saw blade, comprising the steps of,

positioning a log or cant in preparation for sawing in a saw line on the log or cant,

projecting a first light line onto the surface of the log or cant at the projected saw entry line, and a second light line onto the surface of the log or cant at the projected saw exit line,

measuring the distance between the first light line and the second light line on the log or cant to determine depth of cut, and

controlling the feed speed of the log or cant past the saw blade during the sawing step, to a predetermined feed speed for the measured depth of cut to avoid overfeed and underfeed.

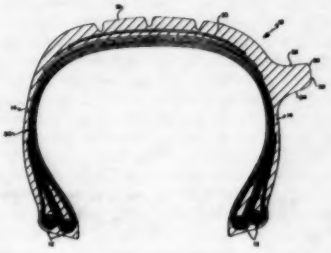
4,926,918

PNEUMATIC TIRE

Edward J. Demor, III, Copley; Walter W. Hinkel, Massillon, and Lewis T. Lukich, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 21, 1989, Ser. No. 313,192
Int. Cl.[5] B60C *13/02*
U.S. Cl. 152—154 **4 Claims**

1. A pneumatic tire having sidewalls, comprising: a chine extending generally axially from a sidewall, the chine having a width and a thickness, the average thickness of the chine between a point located at 50% of the width of the chine from the sidewall and the end of the chine being at least 50% of the width of the chine and wherein the thickness measured at a



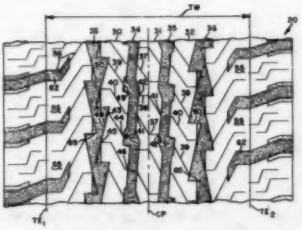
point located at 50% of the width of the chine from the sidewall is at least 66% of the width of the chine.

4,926,919

VEHICLE TIRE WITH RIB TYPE TREAD PATTERN HAVING SIPES ACROSS THE RIBS

William M. Hopkins, Hudson; Robert A. Brightwell, Uniontown; Ray A. Young, East Sparta; John K. Clark, Copley; Frederick W. Miller; Richard L. Galante, both of Akron; Terry J. Walbel, Wadsworth, and Michael A. Kolowski, Mogadore, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 14, 1988, Ser. No. 270,598
Int. Cl.[5] B60C *11/12*
U.S. Cl. 152—209 R **17 Claims**



1. A tire comprising a tread having a pair of lateral edges and a st of at least three ribs extending circumferentially thereabout with each said rib having a pair of lateral edges bordered by two grooves which each extend circumferentially about the tread, the central rib of said set being disposed midway between said tread edges and having a series of grooves therein which extend completely thereacross and are disposed obliquely with respect to a plane containing the axis of rotation of the tire, the depth of each of the obliquely extending grooves in said central rib varying along its length such that its minimum depth is not more than 50% of its maximum depth, said central rib having a pair of lateral edges and each obliquely extending groove in the central rib is at its maximum depth at the junction of the oblique groove and only one lateral edge of the rib, said maximum depth of each obliquely extending groove in said central rib being at an opposite lateral edge of said central rib from the maximum depth junctions of the circumferentially next adjacent obliquely extending grooves in said central rib, at least one other rib of said set being disposed on each side of said central rib, said other ribs having each having a series of grooves therein which extend completely thereacross and are disposed obliquely with respect to a plane

containing the axis of rotation of the tire, the variation in depth along the length of each of the obliquely extending grooves in said other ribs differing from the variation in depth along the length of the circumferentially next adjacent obliquely extending grooves in the same rib, said circumferentially extending grooves having greater maximum depths than the maximum depths of any of the obliquely extending grooves in all of said ribs have widths such that the obliquely extending grooves close up in a footprint of the tire, and the circumferentially extending grooves have widths such that they do not close up in a footprint of the tire, a circumferentially extending array of shoulder blocks being disposed between each lateral edge of the tread and the nearest of said circumferentially extending grooves, the circumferentially next adjacent blocks in said arrays being separated from one another by grooves extending from the respective tread edge to the nearest circumferentially extending groove with a portion of each said separating groove being disposed obliquely with respect to a plane containing the axis of rotation of the tire in a sense that is opposite to the sense at which the grooves extending across the rib nearest to the respective tread edge are oriented.

4,926,920

PNEUMATIC TIRE-THE CARCASSE OF WHICH IS FORMED OF A REGENERATED CELLULOSE FIBER

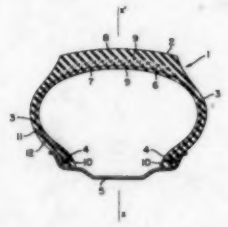
Jacques Gouttebessis, Chanat-la-Mouteyre, France, and Philippe Villaine, Dubendorf, Switzerland, assignors to Michelin Recherche et Technique S.A., Basel, Switzerland

Filed Oct. 22, 1986, Ser. No. 922,028

Claims priority, application France, Oct. 24, 1985, 85/16078

Int. Cl.[5] B60C *9/04*; D02G *3/48*

U.S. Cl. 152—548 **6 Claims**



1. A pneumatic tire comprising at least one carcass ply, said tire being characterized by the fact that said carcass ply is formed, at least in part, of a regenerated cellulose fiber, said fiber being formed of at least one filament having a base material selected from the group consisting of cellulose and cellulose derivatives containing cellulose ester groups, at least a part of these ester groups being formate groups, said fiber having the following properties:

(a) the degree of substitution DS of the cellulose by formate groups is less than 2% and the degree of polymerization DP of the cellulose is greater than 150 and less than 1200 and the degree of substitution DS of the cellulose by ester groups other than formate in zero or less than 1.5%;

(b) the degree of polymerization DP of the cellulose, the tenacity T and the initial modulus M_i of the fiber verify the following relationships, T and M_i being expressed in cN/tex:

for $150 < DP < 200$: $T > 20$ and $M_i > 1800$;

for $200 \leq DP < 300$: $T > 30$ and $M_i > 2000$;

for $300 \leq DP < 400$: $T > 40$ and $M_i > 2400$;

for $400 \leq DP < 1200$: $T > 60$ and $M_i > 2600$; and

(c) each filament has a morphology such that it is formed, at least in part, by layers which are embedded in each other, these layers surrounding the axis of the filament, and such that in each layer the optical direction and the direction of crystallization vary pseudoperiodically along the axis of the filament.

4,926,921

LOUVER

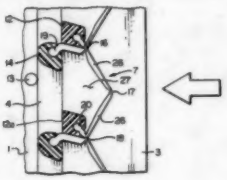
Joachim Heinemann, Weinheim; Karl-Heinz Spies, Birkenau; Frank Keller, Weinheim; Bernd Beicht, Gross-Umstadt; Wulf Leitermann, Bad Wimpfen, and Rolf Lechler, Necharsulm, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstr. and Firma Audi AG, Ingolstadt, both of, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,423

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1987, 3731980

Int. Cl.[5] E06B *3/48*

U.S. Cl. 160—115 **13 Claims**



1. A louver for selectively closing flow openings defined therethrough comprising:

(a) a stationary support grid including a plurality of equidistantly spaced, first rods extending in a first direction to define flow openings therebetween;

(b) a movable grid including a plurality of spaced, second rods extending parallel to said first rods and being movable relative to said first rods in a straight path in a second direction perpendicular to said first direction from a first position in which each of said second rods at least partially overlaps a respective one of said first rods to a second position spaced from said first position by a distance approximately equal to the equidistant spacing between said first rods; and

(c) a plurality of substantially impermeable, flexible, flat structures each having first and second longitudinal edges and each of which is connected along the entire length of its first edge to one of said first rods and along the entire length of its second edge to a respective second rod that at least partially overlaps said one first rod in said first position, said flat structures having a width at least as wide as the width of said equidistant spacing whereby when said second rods are moved to said second position said flat structures close said flow openings.

4,926,922

CURTAIN DRAWING DEVICE

Fumio Shimazaki, Osaka, Japan, assignor to Topia Industry Co., Ltd., Higashiosaka, Japan

Filed Nov. 30, 1988, Ser. No. 277,841

Claims priority, application Japan, Dec. 4, 1987, 62-305956; Aug. 8, 1988, 63-196037

Int. Cl.[5] A47H *5/06*

U.S. Cl. 160—331 **4 Claims**

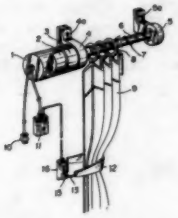
1. A curtain drawing device for a curtain providing either manual or automatic drawing of said curtain comprising:

an electric motor;

a curtain rod, which is rotatably mounted and connected to said electric motor so that said electric motor can drive said curtain rod rotatably;

an exteriorly-protruding longitudinally-extending spiral element attached to an outer circumference of said curtain rod, said spiral element encircling said curtain rod;

a plurality of rings, through which said curtain rod passes, each of said rings having a larger diameter than a diameter of said curtain rod including said spiral element, said curtain being attachable to said rings for suspension from said curtain rod, and



a tassel band and a solenoid-actuated tassel holder, which holds one end of said tassel band and which is structured to release said tassel band when said solenoid-actuated tassel holder receives an external electrical signal.

4,926,923

DEPOSITION OF METALLIC PRODUCTS USING RELATIVELY COLD SOLID PARTICLES

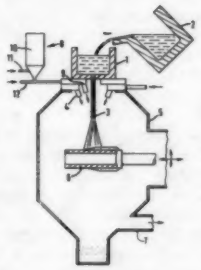
Reginald G. Brooks; Alan Leatham, and Jeffrey Coombs, all of Swansea, Wales, assignors to Osprey Metals Ltd., Wales

Filed Mar. 24, 1986, Ser. No. 842,943

Claims priority, application United Kingdom, Mar. 25, 1985, 8507647

Int. Cl.[5] B22D *23/00*

U.S. Cl. 164—5 **7 Claims**



1. A method of increasing the solidification rate of a coherent spray deposited product produced from metal or metal alloy and thereby refining its microstructure comprising the steps of

heating the metal or metal alloy above its liquidus temperature to form molten metal or metal alloy,

atmoizing a stream of the molten metal or metal alloy to form a spray of hot metal atomized droplets by subjecting the stream to relatively cold gas directed at the stream,

introducing relatively cold solid particles into the spray of the molten metal or metal alloy,

co-depositing the spray of solid particles and atomized droplets onto a collecting surface and,

maintaining the surface of the already deposited metal or metal alloy in a semi-solid/semi-liquid state into which the solid particles and atomized droplets are co-deposited, the application of relatively cold solid particles increasing the solidification rate of the semi-solid/semi-liquid surface and thereby generating a fine uniform grain size which bears no direct relationship to the size of the atomized droplets.

4,926,924

DEPOSITION METHOD INCLUDING RECYCLED SOLID PARTICLES

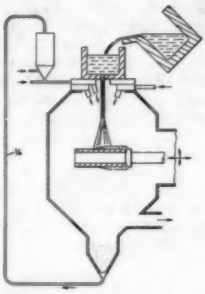
Reginald G. Brooks; Alan Leathman, both of Swansea, and Jeffrey Coombs, Neath, all of Wales, assignors to Osprey Metals Ltd., Wales, Wales

Continuation of Ser. No. 842,943, Mar. 24, 1986. This application Jun. 16, 1989, Ser. No. 367,029

Claims priority, application United Kingdom, Mar. 25, 1985, 8507647

Int. Cl.[5] B22D *23/00*

U.S. Cl. 164—5 **12 Claims**



1. A method of spray depositing a coherent product from a metal or metal alloy comprising the steps of heating the metal or metal alloy above its liquidus temperature to form molten metal or metal alloy, atomizing a stream of the molten metal or metal alloy to form a spray of hot metal atomized droplets by subjecting the stream to gas which is at a temperature less than that of the molten metal or metal alloy directed at the stream, depositing the atomized droplets onto a collecting surface on which the coherent product is formed, collecting atomized droplets which are not deposited on the collecting surface as an overspray powder of solid particles, recycling said solid particles, introducing said solid particles into the stream or spray of the molten metal or metal alloy, and co-depositing the solid particles with the atomized droplets onto the collecting surface.

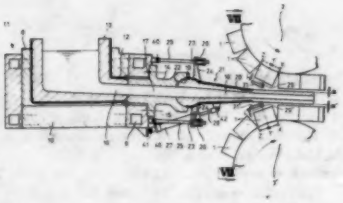
9. Apparatus for spray depositing a coherent spray deposit comprising a collecting surface, means for producing a stream of molten metal or metal alloy, means for atomizing the stream to produce a spray of molten metal or metal alloy particles directed at the collecting surface whereby a coherent spray deposit is formed on the collecting surface, means for introducing solid particles into the stream or spray, means for collecting non-deposited atomized droplets as an overspray powder of solid particles, and means for recycling the overspray to the introducing means whereby said overspray powder form a source of said solid particles.

4,926,925

POURING APPARATUS FOR MOVING-MOLD TYPE CONTINUOUS CASTING MACHINE

Shuzo Takahashi, Yokohama; Yutaka Tsuchida, Yokosuka; Shiro Onuda, Yokohama; Nobuhisa Hasebe, Yokohama, and Masayuki Nakada, Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha and Nippon Kokan Kabushiki Kaisha, both of, Japan

Filed May 17, 1989, Ser. No. 352,862
Claims priority, application Japan, Jun. 8, 1988, 63-141350
Int. Cl.[5] B22D *11/06, 11/18*
U.S. Cl. 164—154 **1 Claim**



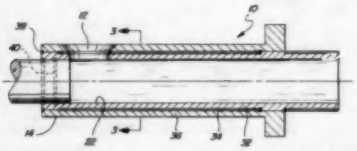
1. A pouring apparatus for a moving-mold type continuous casting machine comprising a tundish nozzle adapted to be tilted or inclined with respect to a melt output of a tundish, a hydraulic cylinder for tilting or inclining said tundish nozzle, position sensors disposed at an inlet of a mold cavity defined by upper and lower block molds each for detecting distance from a corresponding block mold passing past said inlet and a control device responsive to outputs from said position sensors for detecting deflection of a leading end of said tundish nozzle with respect to the upper and lower block molds, thereby outputting a drive signal to said hydraulic cylinder.

4,926,926

THREE LAYER SHOT SLEEVE ASSEMBLY

Kenneth P. Zecman, 46520 Strathmore, Plymouth, Mich. 48170

Filed Dec. 5, 1988, Ser. No. 279,924
Int. Cl.[5] B22D *17/10*
U.S. Cl. 164—312 **13 Claims**



1. A shot sleeve assembly for moving molten metal into a mold cavity, said assembly comprising:

an elongated shot sleeve having a bore extending axially therethrough from a first end to a second end adapted to be positioned adjacent the mold cavity;

a well opening extending through a side wall of said sleeve at a location adjacent said first end; and

an injection piston slidably mounted in said bore, wherein the shot sleeve includes:

an inner barrel extending the length thereof;

an intermediate layer of high thermal conductivity material disposed around, secured to and covering substantially the entire outer surface of the inner barrel commencing at a point medial of the first end and the well and terminating at a point proximate and spaced from the second end to form a two-layer assembly; and

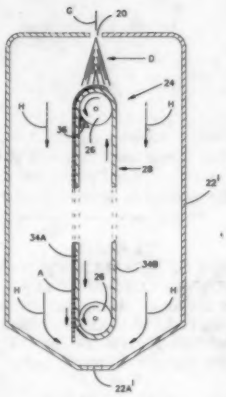
a high yield strength outer shell enclosing under compression said two-layer assembly, extending beyond the terminal ends of said twolayer assembly and being secured to the inner barrel to envelop and trap said intermediate layer, said outer shell having a mass and a yield strength substantially greater than that of said inner barrel.

4,926,927

VERTICAL SUBSTRATE ORIENTATION FOR GAS-ATOMIZING SPRAY-DEPOSITION APPARATUS

Gary W. Watson, Cheshire; Cheskis Harvey P., North Haven, and Ashok Sankaranarayanan, Bethany, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Sep. 20, 1988, Ser. No. 246,704
Int. Cl.[5] B22D *23/00, 11/06;* **C23C** *4/12*
U.S. Cl. 164—429 **7 Claims**



1. In a molten metal gas-atomizing spray-depositing apparatus, the combination comprising:

(a) means employing a pressurized gas flow for atomizing a stream of molten metal into a spray pattern of metal particles and producing a flow of said particles in said pattern thereof along with the gas flow in a generally downward direction; and

(b) means movable continuously along an endless path and having an area thereon disposed below said atomizing means for receiving a deposit of said particles flowing in said spray pattern to form a product thereon, said endless path of said movable means being generally elongated in the downward direction and thus extending parallel to the general downward direction of gas flow such that any particle overspray past said deposit-receiving area is carried by the gas flow downward past said movable means, substantially avoiding entrainment of the particle overspray in the product being formed thereon.

4,926,928

PROTECTIVE DEVICE OF RESTRAINING ROD PRODUCED IN CONTINUOUS CASTING AND ROLLING PROCESS

James H. Leckie, Huntington, Ind., assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Jul. 29, 1985, Ser. No. 760,202
Int. Cl.[5] B22D *11/12*
U.S. Cl. 164—452 **5 Claims**

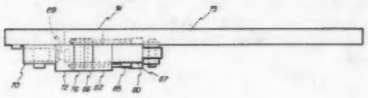
1. A method of manufacturing rod by continuously casting a molten metal on a continuous casting apparatus to form a continuous bar, the bar is rolled through a series of rolling mill stands to form rod, the rod is passed through an eddy current detector to detect flaws, and then coiled, characterized by:

sensing a break in said bar or rod, and

activating a protective device between said mill stands and

said eddy current detector to prevent any projections formed on the rod by the break in said bar or rod from damaging said eddy current detector.

3. A continuous casting apparatus for producing a continuous rod having a plurality of mill stands for forming said continuous rod and an eddy current detector disposed downstream of said mill stands to detect surface flaws in said continuous rod characterized by:



means for detecting a break in said continuous rod, and

means for protecting said eddy current detector disposed between said mill stands and said eddy current detector and activated by said detecting means upon a break in said rod to prevent any projections formed on the rod due to said break from damaging said eddy current detector.

4,926,929

DUMMY BAR FOR CONTINUOUS CASTING MACHINES

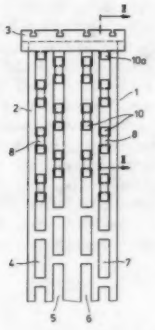
Hans Streubel, Erkrath, Fed. Rep. of Germany, assignor to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Aug. 8, 1989, Ser. No. 390,724

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1988, 3827582

Int. Cl.[5] B22D *11/08*

U.S. Cl. 164—445 **13 Claims**



1. A dummy bar for continuous casting machines having an at least partially arc-shaped strand guide comprising:

a dummy bar head;

a flexible sheet fastened to said dummy bar head and having rows of contact elements extending longitudinally therealong;

the contact elements being fastened along a portion of their length to said sheet, each of said contact elements in one of said rows having projections which overlap projections of contact elements disposed in others of said rows in a direction longitudinal of said sheet; and

recesses disposed along said rows of said flexible sheet, said overlapping projections of each of said contact elements extending into associated ones of said recesses.

4,926,930

PROCESS AND MACHINE FOR THE CONTINUOUS CASTING OF A THIN METAL PRODUCT

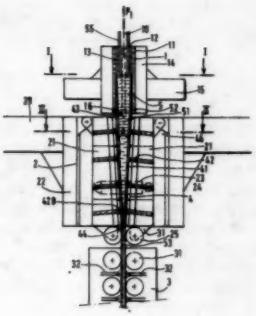
Pierre Gay, L'Etrat, and Robert Vatant, Saint-Chamond, both of France, assignors to Clecim, Courbevoie Cedex, France

Continuation of Ser. No. 31,472, Feb. 25, 1987, abandoned. This application Nov. 22, 1988, Ser. No. 274,554

Claims priority, application France, Jun. 25, 1985, 85 09661

Int. Cl.[5] B22D *11/00*

U.S. Cl. 164—476 **13 Claims**



1. A process for the continuous casting of thin metal products, comprising the steps of

(a) pouring molten metal into an openended mold (1) having two wide walls (11) and two narrow walls (12) which are cooled, to form a flat product (5) which consists of a liquid core (51) surrounded by a solidified skin (52);

(b) discharging said flat product through exit orifices (16) of the mold (1) and subsequently passing said product into a secondary cooling device (2, 3) equipped with means (4) for cooling and retaining at least the large faces of the product until complete solidification;

(c) providing the wide walls (11) of the mold in a curved shape so that the cast product has a widened central part (55) narrowing in the form of a spindle to edges having a thickness equal to that of the thin product to be cast; flattening the central part (55) of the product (5) progressively to a thickness equal to that of the edges in a reducing stand (2) located immediately downstream of the exit orifice of the mold (1) and comprising two surfaces for respectively guiding and straightening the two large faces of the product, the profile of which is determined as a function of the casting speed, so as to exert a pressure uniformly distributed over the entire surface thereby causing and controlling, on each of the large faces, the symmetrical movements of two straightening zones from the edge towards the axis at a speed the respectively axial and radial components of which are substantially constant and synchronized with the casting speed, in order to carry out continuous straightening of the wide walls of the product, up to complete solidification.

4,926,931

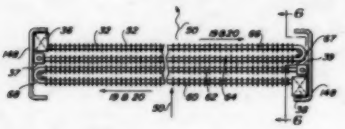
FREEZE PROTECTED, AIR-COOLED VACUUM STEAM CONDENSERS

Michael W. Larinoff, 370 Holly Hill Rd., Oldsmar, Fla. 34677

Continuation of Ser. No. 270,656, Nov. 14, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 409,952

Int. Cl.[5] F28B *1/06, 9/10*

U.S. Cl. 165—111 **7 Claims**



4. For use in condensing steam, input header means, output header means, a plurality of sets of tubes each in a U-shaped configuration and together forming a bundle, each tube having an input length terminating at an input end and an output length terminating at an output end and with a bight therebetween, each tube coupling a front header means with a rear header means and with the output ends of the tubes being positioned between the input lengths of each pair for the thermal protection thereof.

4,926,932

PLATE TYPE HEAT EXCHANGER

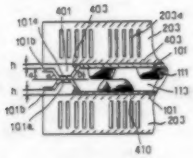
Toshio Ohara, Kariya, and Yoshiyuki Yamauchi, Chita, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 15, 1988, Ser. No. 219,266

Claims priority, application Japan, Aug. 9, 1987, 62-199490

Int. Cl.[5] F28B *1/06, 9/08*

U.S. Cl. 165—111 **6 Claims**



1. A plate type heat exchanger comprising:

a plurality of tube units for forming a tank portion to which fluid is introduced and a tube portion through which passes fluid introduced into said tank portion; and

a corrugated fin having bent portions and straight portions for promoting heat exchange between the fluid within said tube portion and air passing through said corrugated fin,

said bent portions being connected at an outer surface of each of said tube units at said tube portion thereof and each of said straight portions extending from one of said bent portions to an adjacent bent portion;

each of said tube units being formed by a pair of plates each having a connecting portion at which said pair of plates are connected to each other continuously around an outer periphery of said plates;

the connecting portion at least one of said pair of plates being transversely spaced a predetermined amount from its adjacent corrugated fin which extends outwardly beyond said connecting portion; and

said one plate having at an outer side of its said connecting portion an elongated portion angling outward from its said connecting portion toward said corrugated fin and forming therewith a predetermined gap which is smaller than said predetermined amount and further forming with its said connecting portion and its said corrugated fin a draining space for draining water condensed on the outer surface of the tube unit and the corrugated fin.

4,926,933

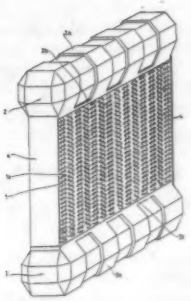
METHOD AND APPARATUS RELATING TO HEAT EXCHANGERS

James Gray, 10 Grange Park Avenue, Raumati South, New Zealand

Filed Nov. 16, 1987, Ser. No. 120,986

Int. Cl.[5] F28F *9/02*

U.S. Cl. 165—173 **1 Claim**



1. A heat exchange unit having a plurality of tube members for the passage of fluid therethrough, characterized in that each tube member is formed by an extrusion process from a heat resistant substantially rigid setting plastic material so as to have a wall part with an uninterrupted smooth cylindrical bore and a solid thin helical external fin formed integrally with the tube wall part and extending along at least a major part of its length, said plurality of extruded plastic tube members are disposed in spaced substantially parallel relationship and are joined at one end to a first plastic manifold member and at their opposite ends to a second plastic manifold member in providing communication between the two manifold members for the passage of fluid therebetween, and at least some of said extruded plastic tube members have their helical fins oppositely wound relative to the other of said tube members, and said tube members with the oppositely wound fins are located in staggered relationship relative to said other tube members to provide a counter baffling effect on fluid passed externally over said tube members.

4,926,934

RADIATOR TANK PLATES

Eugene S. Ivy, 2247 Carrolton Dr., Southaven, Miss. 38671

Filed May 22, 1989, Ser. No. 355,271

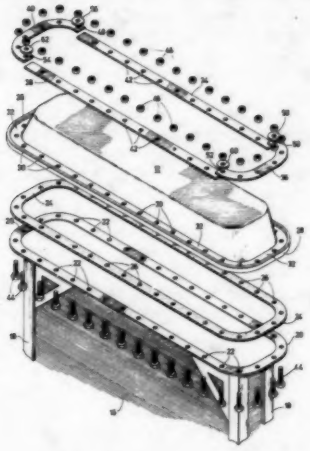
Int. Cl.[5] F28F *9/02;* **B65D** *6/36*

U.S. Cl. 165—173 **3 Claims**

1. Apparatus for use with a radiator tank having a surface with a plurality of spaced bolt holes therein whereby said tank may be bolted to a radiator core, said apparatus comprising:

Four (4) plates, each having two ends, shaped to be superposable on said surface and having a plurality of bolt holes therein congruent with said bolt holes in said surface, whereby

said tank and said plates may be bolted to said core in superposed position such that ends of adjacent plates abut; and



Four (4) washers positioned at bolt holes nearest where the ends of said plates abut whereby said washers overlap the edges of adjacent plates to maintain said plates coplanar.

4,926,935

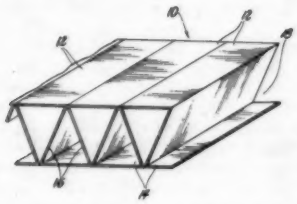
COMPRESSED FIN HEAT SINK

Frederick W. Haushalter, Kenton, Ohio, assignor to Robinson Fin Machines, Inc., Kenton, Ohio

Filed Mar. 6, 1989, Ser. No. 319,348

Int. Cl.[5] F28F *7/00;* **H01L** *23/36*

U.S. Cl. 165—185 **2 Claims**



2. A method for creating a heat sink from a length of fin, the method comprising:

generating a continuous corrugated piece of fin from a flat sheet of a metal, the fin including top and bottom connecting surfaces for connecting interposing lines of fin;

compressing the fin to form continuous top and bottom flat surfaces; and

bonding the compressed corrugated top and bottom connecting surfaces of the fin to generate permanent continuous top and bottom flat surfaces, whereby components may be directly mounted on the flat surface without the need for an intervening base plate.

4,926,936

MULTIPLE PURPOSE LINER HANGER CONSTRUCTION

Britt O. Braddick, Houston, Tex., assignor to Texas Iron Works, Inc., Houston, Tex.

Filed Jul. 20, 1989, Ser. No. 382,195

Int. Cl.[5] E21B *23/00*

U.S. Cl. 166—217 **29 Claims**

1. In a liner hanger which may be actuated hydraulically or mechanically for supporting a liner lowered on an operating string to position in a tubular member in a well bore including:

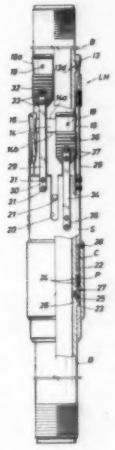
a longitudinally extending tubular body;

upper and lower longitudinally spaced annular rings on said body;

upper and lower cone segments for removably fitting on said upper and lower rings;

said upper and lower cone segments having longitudinally extending edges;

surface means on each of said upper and lower rings to enable said upper and lower cone segments to be removably positioned thereon;



additional surface means on each of said upper and lower rings;

surface means on each said upper and lower cone segments engageable with said surface means and additional surface means on said upper and lower rings to removably retain said upper and lower cone segments on each of said upper and lower rings, respectively; and

means to removably secure said upper and lower cone segments in predetermined positions on each of said upper and lower rings, respectively.

4,926,937

COMPOUND LINKAGE-ARM ASSEMBLY FOR USE IN BORE-HOLE TOOLS

Jim P. Hademenos, Friendswood, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Filed Jun. 8, 1989, Ser. No. 363,584

Int. Cl.[5] E21B *23/00, 47/00*

U.S. Cl. 166—206 **7 Claims**

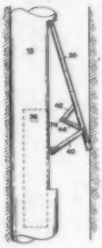
1. An apparatus for urging a device against a wall of a container, comprising in combination:

(a) a drive means within the device;

(b) an arm pivotably coupled at one end to the device, the arm adapted to rest adjacent the device and to swing out from the device in an arc to engage the wall of the container;

(c) first means interconnecting the arm and the drive means for extending and retracting the arm along the arc with respect to the device upon actuation of the drive means; and

(d) second means pivotally coupled to the arm and to the first means for exerting an initial lateral force upon the



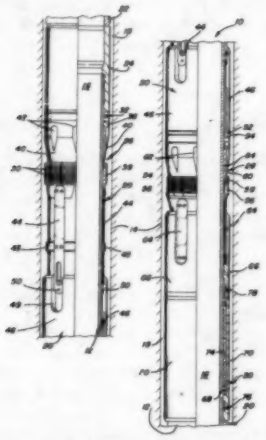
arm with actuation of the drive means, thereby extending and retracting the arm with respect to the device.

4,926,938

ROTATABLE LINER HANGER WITH MULTIPLE BEARINGS AND CONES

Hiram E. Lindsey, Jr., Midland, Tex., assignor to Lindsey Completion Systems, Inc., Midland, Tex.

Filed May 12, 1989, Ser. No. 351,734
Int. Cl.[5] E21B *23/00*
U.S. Cl. 166—208 14 Claims



1. A rotatable liner hanger and casing liner assembly for securing the casing liner within a well bore comprising:

an upper slip assembly mounted to the casing liner, said upper slip assembly including a plurality of slip elements and a slip cone;

an upper bearing assembly mounted to the casing liner adjacent said upper slip assembly for rotation of the casing liner relative to said upper slip assembly;

a lower slip assembly mounted to the casing liner, said lower slip assembly including a plurality of slip elements and a slip cone;

a lower bearing assembly axially slidably mounted to the casing liner adjacent said lower slip assembly for rotation of said lower slip assembly relative to said upper slip assembly and rotation of the casing liner relative to said lower slip assembly; and

fluid pressure responsive means mounted to the casing liner for effecting longitudinal movement of said lower slip assembly, said lower bearing assembly and said slip elements of said upper slip assembly to set said upper slip assembly and said slip elements of said lower slip assembly to secure the casing liner within the well bore.

4,926,939

HYDRAULICALLY ACTUATED LINER HANGER

J. Lindley Baugh, Houston, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.

Continuation of Ser. No. 325,235, Mar. 16, 1989, abandoned.
This application Nov. 3, 1989, Ser. No. 431,302
Int. Cl.[5] E21B *23/04*
U.S. Cl. 166—208 9 Claims

1. A liner hanger for a cased subterranean well comprising:

an elongated tubular body having a small diameter fluid passage in the wall thereof extending from a bore opening below the upper end of said tubular body to an opening in the exterior of the tubular body above the bottom end of said tubular body;

a running tool detachably secured to the upper end of said tubular body;

means in said running tool for pressurizing fluid in said fluid passage;

ramp means secured to the exterior of said tubular body adjacent said lower end of said tubular body;

a sleeve piston surrounding said lower end of said tubular body and defining an annular chamber communicating with said exterior opening of said fluid passage;

said small diameter fluid passage and said annular chamber being fillable at the well surface with a clean fluid;

seal means for applying a force derived from said pressured clean fluid to said sleeve piston to move said sleeve piston axially relative to said ramp means; and

a plurality of peripherally spaced slips operably connected to said sleeve piston and movable thereby into engagement with said ramp means.

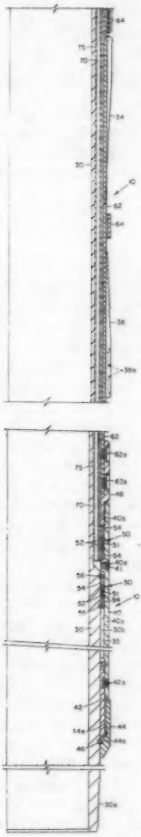
7. The method of hydraulically setting a liner hanger in a well casing, said liner hanger comprising an elongated tubular body having ramp means on its exterior, a piston sleeve surrounding its lower portion, and peripherally spaced slips axially movable by said piston sleeve into operable engagement with said ramp means to expand into biting engagement with the well casing, comprising the steps of:

providing a small diameter fluid passage in the wall of said tubular body extending from a bore opening below the upper end of said tubular body to an exterior opening in said tubular body above the bottom end of said tubular body;

providing seal means intermediate the bore of said sleeve piston and the adjacent exterior surface of said tubular body to define an annular fluid pressure chamber communicating with said bottom exterior opening of said small diameter fluid passage;

filling said small diameter fluid passage and said annular

pressure chamber at the well surface with a clean fluid; and



applying pressure to the clean fluid in upper end of said small diameter fluid passage by an isolating piston to produce axial movement of said sleeve piston to set said slips.

4,926,940

METHOD FOR MONITORING THE HYDRAULIC FRACTURING OF A SUBSURFACE FORMATION

David C. Stromswold, Addison, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 6, 1988, Ser. No. 240,308

Int. Cl.[5] E21B *43/267, 49/00*

U.S. Cl. 166—247 **12 Claims**

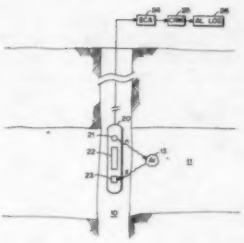
1. A method for monitoring the hydraulic fracturing of a subsurface formation of interest, comprising the steps of:

(a) logging a subsurface formation through a measurement of delayed gamma rays from the neutron activation of a characteristic element of said formation,

(b) injecting a fracturing fluid into said formation to hydraulically create a fracture within said formation,

(c) injecting a proppant into said fracture containing said element which emits delayed gamma rays in response to neutron activation,

(d) logging said proppant containing said fractured formation through a measurement of delayed gamma rays from the neutron activation of said proppant containing fractured formation, and



(e) identifying the extent of proppant deposition within said fractured formation from the difference in the delayed gamma ray measurements of said formation before and after said proppant injection.

4,926,941

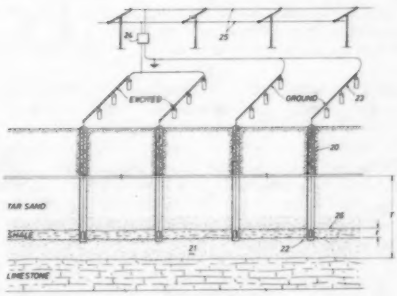
METHOD OF PRODUCING TAR SAND DEPOSITS CONTAINING CONDUCTIVE LAYERS

Carlos A. Glandt; Harold J. Vinegar, and Michael Prats, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 10, 1989, Ser. No. 419,172

Int. Cl.[5] E21B *43/24*

U.S. Cl. 166—248 **9 Claims**



1. A process for recovering hydrocarbons from a hydrocarbon-bearing deposit, comprising:

selecting a hydrocarbon-bearing deposit which contains a thin conductive layer within the deposit;

installing electrodes spanning the thin conductive layer;

electrically heating the thin conductive layer to form a thin preheated zone immediately adjacent to the thin conductive layer;

providing wells for hot fluid injection into the deposit and hydrocarbon production from the deposit;

injecting a hot fluid into the deposit adjacent to the thin conductive layer and within the thin preheated zone to displace the hydrocarbons to the production wells; and

recovering hydrocarbons from the production wells.

9. A process for increasing the injectivity of a hydrocarbon-bearing deposit, comprising:

selecting a hydrocarbon-bearing deposit which contains a thin conductive layer within the deposit;

installing electrodes spanning the thin conductive layer;

electrically heating the thin conductive layer to form a thin preheated zone immediately adjacent to the thin conductive layer;

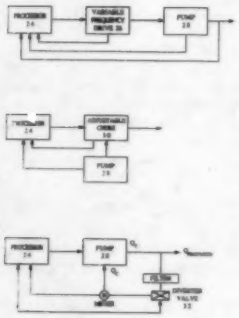
heating the thin preheated zone by thermal conduction to a temperature sufficient to allow injection of fluids into the thin preheated zone.

4,926,942

METHOD FOR REDUCING SAND PRODUCTION IN SUBMERSIBLE-PUMP WELLS

William P. Profrock, Jr., 5122 Lawn Arbor, Houston, Tex. 77066

Filed Feb. 22, 1989, Ser. No. 313,716
Int. Cl.[5] E21B *43/12*
U.S. Cl. 166—250 4 Claims



1. A method of inhibiting the production of sand and other macroscopic particles in a well system producing fluid from a formation through a submersible pump, comprising the repeated performance of the following steps:

(a) measuring the rate of fluid production over a set time interval;

(b) estimating fluid pressure in the region of the formation from the rate of fluid production and fixed physical measurements of the submersible pump and well system;

(c) regulating the rate of fluid production from the formation in response to the estimated fluid pressure in the region of the formation according to a predetermined profile of fluid production versus time, thereby maintaining the rate of change of fluid pressure in the region of the formation below a predetermined limit.

4,926,943

PHENOLIC AND NAPHTHOLIC ESTER CROSSLINKED POLYMERIC GELS FOR PERMEABILITY PROFILE CONTROL

Dennis H. Hoskin, Lawrenceville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 10, 1989, Ser. No. 322,337
Int. Cl.[5] E21B *33/138, 43/22, 43/24*
U.S. Cl. 166—270 15 Claims

1. A process for recovering oil from a subterranean oil-bearing formation having relatively high permeability zones and relatively low permeability zones penentrated by at least one injection well and at least one production well comprising the steps of:

(a) injecting into the relatively high permeability zones of the formation an aqueous gel-forming solution comprising water, a vicoisfying amount of a water-dispersible polymer; and a crosslinking agent in an amount effective to cause gelation of the aqueous solution of said water-dispersible polymer, said crosslinking agent comprising a mixture of an aldehyde and a member selected from the group consisting of phenolic esters, naphtholic esters, halogenated phenolic esters and halogenated naphtholic esters, whereby upon gelation of the solution the zones of relatively high permeabilty of the formation are selectively plugged;

(b) injecting a flooding fluid into the formation via the injection well; and

(c) recovering fluids including oil from the formation via the production well.

4,926,944

LIGNIN-BASED CEMENT FLUID LOSS CONTROL ADDITIVE

Peter Schilling, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Jan. 17, 1989, Ser. No. 297,653
Int. Cl.[5] C04B *7/02*; E21B *33/14*
U.S. Cl. 166—293 8 Claims

1. A hydraulic cement slurry composition which comprises:

(a) a hydraulic cement, and the following expressed as parts by weight per 100 parts of said hydraulic cement,

(b) water from about 25 to 105 parts, and

(c) from about 0.5 to 2.5 parts of a compound selected from the group consisting of a sulfonated lignin and a sulfomethylated lignin, wherein said lignin has been sequentially crosslinked by reacting said lignin with a member of the group consisting of formaldehyde and epichlorohydrin and alkoxylated with between about 2 to about 6 moles of a compound selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide and a combination thereof per 1000 g of said lignin.

5. A method of cementing a zone in a well penetrating a subterranean formation comprising injecting down the well and positioning in the zone to be cemented a hydraulic aqueous cement slurry composition comprising

(a) a hydraulic cement, and the following expressed as parts by weight per 100 parts of said hydraulic cement,

(b) water from about 25 to 105 parts, and

(c) a fluid loss additive comprising from about 0.5 to 2.5 parts of a compound selected from the group consisting of a sulfonated lignin and a sulfomethylated lignin, wherein said lignin has been sequentially crosslinked by reacting said lignin with a member of the group consisting of formaldehyde and epichlorohydrin and alkoxylated with between about 2 to about 6 moles of a compound selected from the group consisting of ethylene oxide, propylene oxide and butylene oxide or a combination thereof per 1000 g of said lignin, and allowing the cement thus positioned to set to a monolithic mass.

4,926,945

SUBSURFACE WELL SAFETY VALVE WITH CURVED FLAPPER AND METHOD OF MAKING

Ronald E. Pringle, Houston, and Arthur J. Morris, Magnolia, both of Tex., assignors to Camco, Incorporated, Houston, Tex.

Filed Sep. 7, 1989, Ser. No. 404,241
Int. Cl.[5] E21B *34/06*
U.S. Cl. 166—321 7 Claims

1. A subsurface well safety valve for controlling the fluid flow through a well conduit comprising,

a housing having an axial bore therethrough,

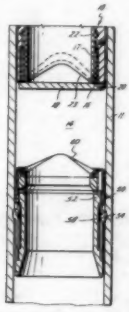
a valve seat positioned in the housing,

a valve closure member movable between open and closed positions relative to the valve seat, said valve closure member being a sector of a cylinder having a concave surface which forms a sealing surface,

said valve seat having a seating surface contoured to coact with the sealing surface,

a flow tube telescopically movable in the housing for controlling the movement of the valve closure member, the lower end of the flow tube having a surface contoured to coact with the concave sealing surface and being substan-

tially equal to the contour of the concave sealing surface, and



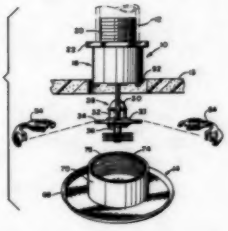
hydraulic piston and cylinder means in the housing actuating the flow tube.

4,926,946

PENDENT STYLE SPRINKLER WITH COVER

George S. Polan, Harleysville, Pa., assignor to Central Sprinkler Corporation, Landsale, Pa.

Filed Nov. 8, 1988, Ser. No. 268,911
Int. Cl.[5] A62C *37/08, 37/10, 33/00, 39/00*
U.S. Cl. 169—37 20 Claims



9. Pendent style sprinkler comprising:

a sprinkler body portion including an outlet side for discharging a fire quenching fluid;

a plug valve movable with respect to said sprinkler body portion for opening said sprinkler when said sprinkler is heated, a portion of said plug valve extending from said outlet side of said sprinkler body portion when said sprinkler is closed;

a clip wedged between said sprinkler body portion and said portion of said plug valve so as to separate from said sprinkler body portion and said plug valve portion when said plug valve moves to open said sprinkler; and

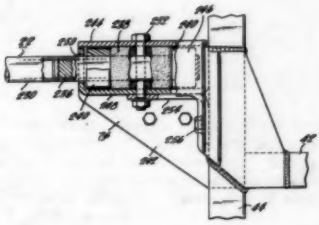
a cover having a central portion contacting a peripheral edge portion of said clip such that said cover is suspended from said peripheral edge portion of said clip.

4,926,947

TURF AERATING APPARATUS WITH RESILIENT HANDLE MOUNT

Mark L. Corine, 5301 S. Coddington Ave., Lincoln, Nebr. 68523; David G. Ferguson, 3035 Cable Ave., Lincoln, Nebr. 68502; Loren F. Hansen, 1629 N. 73rd St., Lincoln, Nebr. 68505, and Mark E. Lamb, 6510 S. 41st St., Lincoln, Nebr. 68516

Division of Ser. No. 120,948, Nov. 16, 1987, Pat. No. 4,867,244.
This application Aug. 16, 1989, Ser. No. 365,525
Int. Cl.[5] A01B *45/02*
U.S. Cl. 172—22 3 Claims



1. Turf aerating apparatus comprising a frame, means supporting said frame for rolling movement across a turf area, means for driving said supporting means to move said frame across the turf, an aerator mechanism mounted on said frame comprising at least one pair of substantially vertical tine arms, each said tine arm having at least one downwardly directed turf coring tine disposed on the lower end thereof, said aerator mechanism including tine arm actuating means connected to the upper end of each said tine arm for imparting an alternating recipricatory motion to said tine arms to drive said tines into the turf, a handle extending rearwardly from said frame having at least one rearwardly extending handle element connected with said frame, vibration damping means connecting said handle to said frame, said latter means comprising a receiver on said frame for receiving one end of said handle element, a resilient sleeve surrounding said end of said handle element and engaged with the inner walls of said receiver, and pivot means extending horizontally through said receiver and said handle element end to permit pivotal movement of said handle element in a vertical plane against the resilient resistance of said sleeve.

4,926,948

METHOD AND APPARATUS FOR CONTROLLING MOTORGRADER CROSS SLOPE CUT

James B. Davidson, New Carlisle; Peter N. Kaz, Medway; Michael H. Kidwell, and Mark E. Zachman, both of Huber Heights, all of Ohio, assignors to Spectra Physics, Inc., San Jose, Calif.

Filed Jun. 28, 1989, Ser. No. 372,909
Int. Cl.[5] E02F *3/84*
U.S. Cl. 172—4.5 8 Claims

1. In a motorgrader having a two-part articulated frame defined by a rear drive unit including rear drive wheels and a front steering unit which can be rotated relative to the drive unit and including front steering wheels, and a blade supported upon the steering unit, the blade being rotatable about a generally vertical axis and being mounted for adjustment of the elevations of the ends of the blade to define a blade slope angle relative to horizontal, apparatus for controlling the cross slope angle of a surface being worked by the motorgrader comprising:

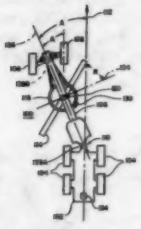
input means for selecting a desired cross slope angle;

first angle sensor means for sensing the angle of rotation of the blade relative to the steering unit;

second angle sensor means for sensing the angle of rotation of said steering unit relative to the drive unit;

first slope sensor means for sensing the blade slope angle of said blade relative to horizontal;

second slope sensor means for sensing the direction of travel slope angle of said motorgrader; and



cross slope control means connected to said input means, to said first and second angle sensor means, and to said first and second slope sensor means for controlling said blade slope angle to maintain said desired cross slope when said motorgrader is operated in a crabbed steering position.

4,926,949

THERMAL SHIELD FOR DRILLING MOTORS

John Forrest, Houston, Tex., assignor to Drilex Systems, Inc., Houston, Tex.

Filed Dec. 7, 1988, Ser. No. 281,153

Int. Cl.[5] E21B 4/02

U.S. Cl. 175—17 **31 Claims**

1. A drilling assembly to be run into a well hole using a drill string, drilling fluid being supplied to said drilling assembly through the drill string, said drilling assembly comprising:

a housing assembly connected to said drill string; and

a fluid operated drilling motor operatively connected to a drilling tool, said drilling motor having a motor housing disposed within said housing assembly;

said housing assembly including baffled fluid passage means surrounding said motor housing for circulating drilling fluid through said housing assembly to maintain the operating temperature of said drilling motor, said housing assembly including at least one inner fluid port to provide fluid communication between the interior of said housing assembly in fluid communication with the motor housing and one end of said fluid passage means and at least one outer fluid port to provide fluid communication between the other end of said fluid passage means and the exterior of said housing assembly, drilling fluid circulating through said at least one inner fluid port, through said circuitous fluid passage means and through said at least one outer fluid port to maintain the operating temperatures.

4,926,950

METHOD FOR MONITORING THE WEAR OF A ROTARY TYPE DRILL BIT

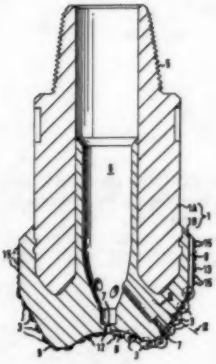
Djurre H. Zijsling, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

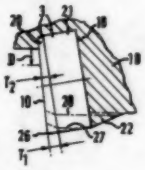
Division of Ser. No. 26,609, Mar. 17, 1987. This application Dec. 20, 1988, Ser. No. 287,640

Claims priority, application United Kingdom, Mar. 27, 1986, 8607700

Int. Cl.[5] E21B 3/00, 12/02

U.S. Cl. 175—39 **2 Claims**





1. A method of monitoring the wear of a rotary type drill bit for deephole drilling subsurface earth formations, comprising:

providing a plurality of cutting elements protruding from a bit body coupled to the lower end of the drill string wherein at least some of the cutting elements are provided with a front layer of interbonded abrasive particles having a thickness which varies substantially with distance from the bit body; and

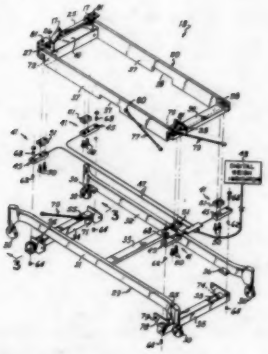
measuring the ratio of torque on bit to weight on bit during drilling as an indication of the thickness of the front layer of abrasive particles presented at the wearing edge of the cutting elements thereby providing an indication of the progress of bit wear.

4,926,951

WEIGH BED

Walter L. Carruth, Cordova; Warren P. Jones, Memphis, both of Tenn., and Richard B. Stacy, Charleston, S.C., assignors to SSI Medical Services, Inc., Charleston, S.C.

Filed Jun. 26, 1989, Ser. No. 371,611
Int. Cl.[5] G01G *19/52, 3/08, 21/24*
U.S. Cl. 177—144 9 Claims



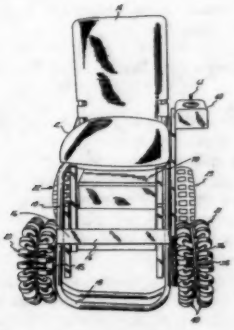
1. A scale comprising:
a base,
a weigh frame mounted above said base,
four laterally and longitudinally spaced load cell beams fixed at one end to said weigh frame,
a ball supporting each said beam for rolling movement on said base,
and means limiting movement of said weigh frame with respect to said base in three axes.

4,926,952

FOUR-WHEEL DRIVE WHEELCHAIR WITH COMPOUND WHEELS

Jeffrey Farnam, 3035 Humboldt Ave. S., Minneapolis, Minn. 55408

Continuation of Ser. No. 204,509, Jun. 9, 1988, Pat. No. 4,823,900. This application Mar. 30, 1989, Ser. No. 331,596
Int. Cl.[5] A61G *5/04;* B62D *11/04*
U.S. Cl. 180—6.5 5 Claims



1. A four-wheel drive vehicle comprising:
a frame;
a pair of non-compound rear wheels mounted near the rear end and on opposite sides of said frame for supporting the rear end thereof, each of said rear wheels mounted for rotation in a fixed plane parallel to the side of said frame;
a pair of front compound wheels mounted near the front end and on opposite sides of said frame for supporting the front end thereof, each of said wheels mounted for rotation in a fixed plane parallel to the side of said frame and providing a substantially continuous traction-providing surface with respect to wheel rotation in said plane and supporting the front end of said vehicle to roll substantially freely transverse to said plane from side to side, the tread of each of said rear wheels providing flotation for each of said rear wheels on outdoor terrain and further wherein the tread of each of said front compound wheels provides flotation which is substantially equal to the flotation of said treads on said front wheels, whereby said front and rear wheels provides substantially the same flotation for said vehicle on outdoor terrain;
differential steering means including first means for connecting the front and rear wheels on one side of said frame to turn in unison, second means for connecting the front and rear wheels on the other side of said frame to turn in unison and motorized drive means including one or more electrical motors and control circuits for applying forward or rearward drive power to each set of connected wheels so that said vehicle may be steered differentially, said motorized drive means further including rechargeable batteries for supplying drive power thereto;
whereby the front wheels play an active role in the driving, steering and braking of the vehicle, so that powered four-wheel drive and four-wheel differential steering is provided, said front compound wheels permitting the vehicle to be turned with substantially less power than that which is required to turn a skid steer four-wheel drive vehicle.

4,926,953

BATTERY HOLD-DOWN STRUCTURE

Richard B. Platt, 381 Country Club La., Detroit, Mich. 48236

Filed Dec. 24, 1984, Ser. No. 685,769
Int. Cl.[5] B60R *18/02*
U.S. Cl. 180—68.5 19 Claims

1. In combination with a battery for a vehicle, a battery tray in which the battery is positioned, a battery strap having openings in the ends thereof positioned over the top of the battery and battery hold-down structure on opposite sides of the battery, each battery hold-down structure including an elongated bolt having a length slightly less than the height of the battery which bolt is threaded over at least one-fourth of its length from one end toward the other end thereof and which bolt includes means at the other end thereof for securing the other

end of the bolt to the battery tray and an elongated nut having a length approximately one half as long as the elongated bolt including a smaller diameter portion extending through an opening in an associated end of the battery strap having an internally threaded axially extending recess therein for receiving the one end of the bolt and a larger diameter end providing an annular abutment between the smaller diameter and larger diameter ends for clamping the battery strap to the top of the battery with the nut extending through the opening in the associated end of the battery strap for approximately one-fourth of the height of the battery from the top toward the bottom of the battery and engaged with the one end of the bolt and with the other end of the bolt secured to the tray, and radially extending wings on the larger diameter portion of the nut having a dimension to permit grasping of the wings in the palm of the hand to facilitate threading the nut on or off of the bolt with the battery tray, battery strap and battery hold-down structure in assembly.

4,926,954

FRONT AND REAR WHEEL STEERING VEHICLE WITH A MINIMIZED MANEUVERING AREA

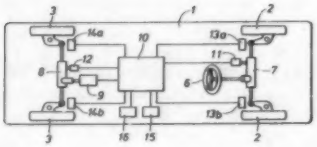
Hiroshi Ataka, and Yoshimi Furukawa, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,966

Claims priority, application Japan, Sep. 16, 1987, 62-231474; Aug. 26, 1988, 63-212260

Int. Cl.[5] B62D 5/06

U.S. Cl. 180—140 **18 Claims**



1. A front and rear wheel steering vehicle, comprising:

manual steering means for manually steering a front wheel;

means for detecting a steering angle of said front wheel;

memory means for storing said steering angle of said front wheel detected by said detecting means; and

powered steering means for steering a rear wheel to a steering angle which coincides, in a spatially fixed absolute coordinate system, with the steering angle of said front wheel stored in the memory means when said front wheel was located at a location which is a current location of said rear wheel.

4,926,955

REAR WHEEL STEERING APPARATUS FOR AUTOMOBILE

Hiroshi Ohmura, Higashihiroshima, and Takashi Nakashima, Hiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Nov. 18, 1988, Ser. No. 273,087

Claims priority, application Japan, Nov. 20, 1987, 62-293288

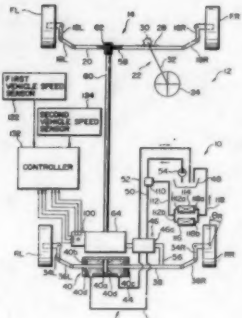
Int. Cl.[5] B62D 6/00, 7/14

U.S. Cl. 180—140 **24 Claims**

1. A rear wheel steering apparatus for an automobile having brake means for braking to wheels, which detects a vehicle speed by vehicle speed detection means and turns rear wheels at a rear wheel turning angle ratio according to the detected vehicle speed upon turning of front wheels, comprising:

discrimination means for discriminating a travel state, including a normal travel state wherein slippage of the wheels has not substantially occurred and a lock state of the wheels wherein the detected vehicle speed is lowered from a predetermined value to substantially zero during actuation of said brake means;

first setting means for, when said discrimination means determines the normal travel state, setting the rear wheel turning angle ratio in accordance with a first characteristic according to the detected vehicle speed; and



second setting means for, when said discrimination means determines a lock state of the wheels, setting the rear wheel turning angle ratio in accordance with a second characteristic for stabilization.

4,926,956

ELECTRONICALLY CONTROLLED STEERING SYSTEM

James J. Duffy, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 115,083, Oct. 30, 1987, Pat. No. 4,828,067. This application Dec. 30, 1988, Ser. No. 292,090

Int. Cl.[5] B62D 5/08

U.S. Cl. 180—142 **3 Claims**

1. A power steering gear system for controlling the dirigible wheels of a vehicle comprising:

a constant flow fluid pressure pump;

a gear mechanism having a torque input member adapted to receive driver steering torque and a torque output member adapted to be connected to the dirigible wheels and a fluid motor having a pressure movable member for augmenting steering torque;

a steering valve assembly having primary and secondary valve portions with registering valve lands that define variable fluid flow areas, and primary valve lands controlling pressure distribution to opposite sides of said pressure movable member to provide a pressure steering assist;

a high pressure passage connecting the flow inlet side of said primary valve portion with the high pressure side of said pump and a low pressure passage connecting the flow

outlet side of said primary valve portion with the low pressure side of said pump;

a steering assist control solenoid valve means communicating with said high pressure passage and said low pressure passage for establishing a bypass flow between said high pressure passage and said low pressure passage;

a steering torque pressure passage extending from said high pressure passage to the inlet side of said secondary valve portion;

a steering torque sensor flow control valve means disposed in and forming a part of said steering torque pressure passage for establishing a constant flow to said secondary valve portion;

an electronic processor unit including a data input portion, an output driver portion and a memory portion, said driver portion being connected to said solenoid valve, said memory portion having stored therein desired functional relationships between steering torque and steering pressure for various vehicle speeds; and

a steering torque pressure sensor and a vehicle speed sensor connected to the data input portion of said processor unit, said pressure sensor being connected to said steering torque pressure passage.

4,926,957

DEVICE CAPABLE OF SUCTION-ADHERING TO A WALL SURFACE AND MOVING THEREALONG

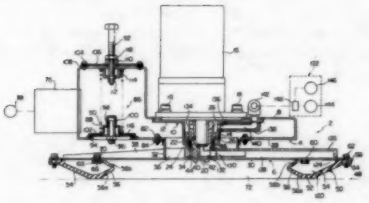
Fukashi Urakami, 5-21-204 Konandai 4-chome, Konan-ku, Yokohama, Japan

Filed Mar. 25, 1988, Ser. No. 174,404

Claims priority, application Japan, Apr. 10, 1987, 62-80320

Int. Cl.[5] B60B *39/00*

U.S. Cl. 180—164 **3 Claims**



1. A device comprising a main body, moving means mounted on the main body, a partitioning member mounted on the main body and defining a pressure reduction space in cooperation with the main body of the device and a wall surface, and vacuum creating means for discharging a fluid from the pressure reduction space, said device being adapted to suction-adhere to the wall surface by the pressure of an ambient fluid acting on the main body of the device owing to the difference in fluid pressure between the inside and outside of the pressure reduction space and to move along the wall surface by the action of the moving means; wherein

the partitioning member has an outside wall portion extending from one end of said member connected to the main body of the device to a contacting portion of said member which makes contact with the wall surface, and an inside wall portion located inwardly of the outside wall portion and extending from said contacting portion to the other end of said member connected to the main body of the device,

a pressure adjusting space is defined by the outside wall portion and the inside wall portion,

a pressurized fluid supply source is provided for pressurizing the pressure adjusting space,

means is provided for feeding a pressurized fluid from the pressurized fluid supply source to the pressure adjusting space to stretch the partitioning member at the time of changing the moving direction of the main body of the device to move the moving means away from the wall surface so that the main body is supported by the partitioning member while the moving direction is changed.

4,926,958

GUIDE DEVICE FOR AUTOMATED GUIDED VEHICLE

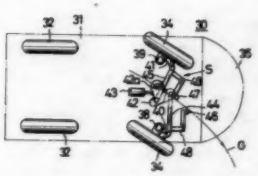
Shoji Nishikawa, Nagoya; Akira Ohkura, and Katsuya Ichida, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jun. 1, 1988, Ser. No. 200,975

Claims priority, application Japan, Jun. 4, 1987, 62-87128; Jun. 10, 1987, 62-89550

Int. Cl.[5] B62D *1/02*

U.S. Cl. 180—168 **9 Claims**



1. An apparatus for guiding an A.G.V. along a guide cable defining a straight and curved course, the A.G.V. having a pair of steerable wheels each mounted at opposite ends of a beam to pivot about a corresponding vertical axis, the beam extending perpendicular to the longitudinal center line of the A.G.V., the apparatus comprising:

a steering linkage for each of the pivotable wheels including,

a bell-crank mounted to the beam substantially equidistant from each wheel and pivotable on a vertical axis on the longitudinal center line;

a knuckle arm connected to each wheel having an end offset from the vertical axis of the corresponding wheel,

a tie-rod for each wheel having a first end pivotably connected to a corresponding knuckle arm and a second end pivotably connected to the bell-crank, the pivotable location of the second end of one of the tie-rods providing for revolving in an arc about the bell-crank axis in a direction toward the center line while the pivotable location of the second end of the other tie-rod provides for revolving in an arc about the bell-crank axis in a direction away from the center line at times when the wheels are turned to travel the curved course;

a detecting coil for each steerable wheel for sensing the magnetic field surrounding the guide cable;

means for connecting each detection coil to the steering linkage of a corresponding wheel effective to position the detecting coils spaced from the beam in a direction of the longitudinal center line a first predetermined equal distance on opposite sides of the longitudinal center line at times when the steering linkage positions the radial extent of the wheels parallel to the longitudinal center line for traveling the straight course;

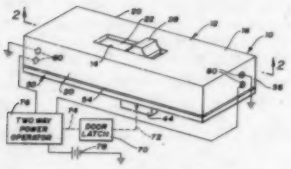
the connecting means being effective to shift both detection coils in a direction transverse the longitudinal center line while decreasing the distance between the detection coils and an extension of a line connecting the pivotal axis of the bell crank and the pivotal location of the second end of the tie-rod revolving in an arc toward the longitudinal center line at times when the steering linkage turns the wheels obliquely to the longitudinal center line for traveling the curved course.

4,926,959

OPERATOR CONTROL FOR VEHICLE COMPONENTS

Frederic R. Adams, Troy; Jeffrey M. Boyer, Rochester; Ronald N. Schultz, Troy, and Barry Taylor, Bloomfield Hills, all of Mich., assignors to Saturn Corporation, Troy, Mich.

Continuation of Ser. No. 261,541, Oct. 24, 1988, abandoned.
This application Aug. 21, 1989, Ser. No. 396,261
Int. Cl.[5] B60R 25/00
U.S. Cl. 180—315 10 Claims



1. In combination with a plurality of vehicle components having controls movable between first and second operative positions, mechanical means for mechanically moving one of the component controls between its first and second operative positions, and power operating means for power moving all of the component controls between their first and second operative positions, an operator control for sequentially operating the mechanical means and the power operating means comprising, a support, a driven member mounted on the support for movement between first and second operative positions corresponding to the first and second operative positions of all of the component controls, means operable upon movement of the driven member between its first and second operative positions for mechanically moving the one component control between its corresponding first and second operative positions, a manually movable drive member mounted on the support for simultaneous movement with the driven member between the first and second positions of the driven member and continued movement independently of the driven member to the first and second operative positions of the drive member corresponding to the first and second operative positions of all of the component controls, means coupling the drive member to the driven member for simultaneous movement of the driven and drive members as a unit between the first and second positions of the driven member to mechanically move the one component control between its first and second operative positions, and means operable at each of the first and second positions of the driven member uncoupling the drive member from the driven member for additional movement of the drive member to the same position as the driven member to actuate the power operating means and power move all of the component controls to the same position as the one component control was moved by the driven member.

4,926,960

ELECTRIC POWER STEERING APPARATUS FOR VEHICLE

Hisatugu Ishikura, Katsuta; Kazuo Tahara, Hitachi; Toshimi Abukawa, Hitachiota; Katsuji Marumoto; Toshiyuki Koterazaka, both of Hitachi; Mitsuyuki Hombu, Katsuta; Tadashi Takahashi, Hitachi; Hirokisu Yamamura, Hitachiota; Toru Tatsuzaki, Hirstsuka; Tsutomu Ohmae, and Shuichi Takamatsu, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Katsuta, both of, Japan

Filed Sep. 16, 1988, Ser. No. 245,349
Claims priority, application Japan, Sep. 16, 1987, 62-229904
Int. Cl.[5] B62D 5/04
U.S. Cl. 180—79.1 4 Claims

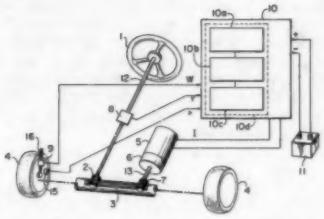
1. An electric power steering apparatus for a vehicle comprising:

a steering shaft;

an electric motor operable to generate an auxiliary steering force having a magnitude corresponding to a value of electric current supplied thereto;

means for detecting an operational state of said steering apparatus, said detecting means including a steering torque sensor for detecting a steering torque applied to said steering shaft and a vehicle weight sensor for detecting a vehicle weight; and

means for controlling a value of electric current to be supplied to said electric motor in accordance with a value detected by said detecting means, said controlling means being constituted to increase and decrease the value of



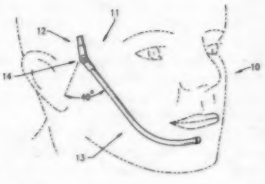
electric current to be supplied to said electric motor in accordance with increase and decrease, respectively, of the value detected by said steering torque sensor, and to increase and decrease the value of electric current to be supplied to said electric motor in accordance with the increase and decrease, respectively, of the value detected by said vehicle weight sensor such that the increase and decrease in the value of electric current based on the value detected by the steering torque sensor is modified by the value detected by the vehicle weight sensor and the auxiliary steering force is increased with increases in vehicle weight.

4,926,961

HINGED ACOUSTICAL VOICE TUBE

Phillip Gattey, Los Gatos, and Shu-Ren Chen, Santa Cruz, both of Calif., assignors to ACS Communications, Scotts Valley, Calif.

Filed Jul. 29, 1988, Ser. No. 226,146
Int. Cl.[5] G10K 11/00
U.S. Cl. 181—22 9 Claims



1. An acoustical voice tube for use with communications equipment, comprising:

a hollow, acoustical upper piece having an upper end for detachable coupling with the communications equipment and a lower end with at least one convex protrusion;

a hollow, acoustical lower piece having a lower end adapted for receiving sound and an upper end having at least one bore aligned for air-tight coupling with said convex protrusion of said lower end of said upper piece and thereby creating a hinged connection between said upper piece and said lower piece.

4,926,962

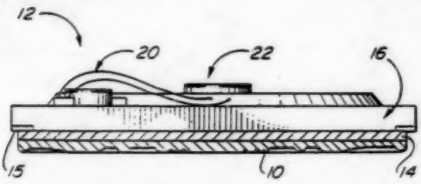
DECORATIVE SPEAKER COVER

Gary T. Graham, 601 Dakota Ave., St. Cloud, Fla. 32769, and Sara L. Gillen, 1011 S. Summerline Ave., Orlando, Fla. 32806

Division of Ser. No. 917,735, Oct. 10, 1986, Pat. No. 4,769,188. This application Aug. 29, 1988, Ser. No. 237,138

Int. Cl.[5] H05K 5/00

U.S. Cl. 181—150 8 Claims



1. A speaker cover for a loudspeaker system for installation in a ceiling or wall composed of panels having a predetermined visible, external appearance, said speaker cover comprising a thin sheet of closed cell foam having a concealed rear surface facing the loudspeaker system and a front visible surface which has the same visible appearance as the panels so that when the speaker cover is installed, said cover appears to be one of the panels of the ceiling or wall.

4,926,963

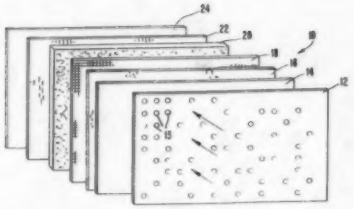
SOUND ATTENUATING LAMINATE FOR JET AIRCRAFT ENGINES

Stephen J. Snyder, West Hills, Calif., assignor to UAS Support, Inc., Geneva, Switzerland

Continuation-in-part of Ser. No. 106,618, Oct. 6, 1987, Pat. No. 4,848,514. This application Apr. 5, 1989, Ser. No. 333,346

Int. Cl.[5] E04B 1/82

U.S. Cl. 181—290 25 Claims



1. A multilayered laminate having improved sound energy attenuating properties comprising:

a perforated facing layer;

a moisture barrier layer adjacent to said facing layer;

a first protecting layer adjacent to said moisture barrier layer;

a screen layer adjacent to said first protecting layer;

an acoustic attenuating material layer adjacent to said screen layer;

a second protecting layer adjacent to said acoustic attenuating material layer; and

a solid backing sheet layer adjacent to said second protecting layer.

4,926,964

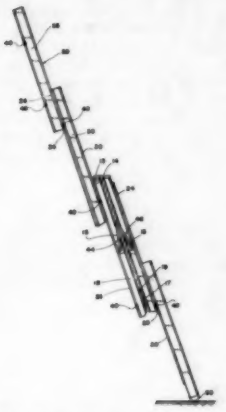
STEP/EXTENSION LADDER

Danny R. Herrin, 4835 Yale St., Metairie, La. 70062

Filed Sep. 5, 1989, Ser. No. 402,561

Int. Cl.[5] E06C 1/18, 1/12

U.S. Cl. 182—22 14 Claims



1. A convertible step/extension ladder, comprising:

a first frame portion;

a second frame portion pivotally attached to said first frame portion, each of said first and second portions comprising a pair of parallel leg members and a plurality of transverse spaced apart rungs fixedly attached to said leg members;

an elongated housing member carried by an exterior of each of the leg members, said housing member having a central opening therein;

at least one extension member having a pair of parallel leg members and a plurality of transverse spaced-apart rungs fixedly attached to the leg members;

an elongated rail member carried by an exterior of the extension leg members, said rail member being slidably engaged within the central opening of the housing member to allow telescopic movement of the extension members along exterior of the frame portion;

means for locking the first and the second frame portions in substantially parallel relationship to each other when the ladder is converted from a step ladder to an extension ladder.

4,926,965

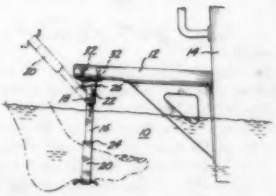
SELF-RETRACTING STEP

Mark Fox, 532-210th SW., Lynnwood, Wash. 98036

Filed Oct. 18, 1989, Ser. No. 423,344

Int. Cl.[5] B63B 27/14, 27/00

U.S. Cl. 182—89 20 Claims



1. A step apparatus, mountable to the exterior of a boat hull

to assist a person in climbing into the boat, the step apparatus comprising:

a support member;

a step member, mounted on the support member for receiving a person's foot, the step member and at least a portion of the support member defining a reactive surface;

pivot means for pivotally mounting the support member to the exterior of the boat hull to pivot the apparatus between an extended position and a retracted position; and

first biasing means for biasing the step member towards the extended position in which a person may be supported by the step member, the first biasing means capable of being overcome by water drag force acting on the reactive surface during movement of the boat to move the step member towards the retracted position, in which the reactive surface presents a reduced drag profile.

4,926,966

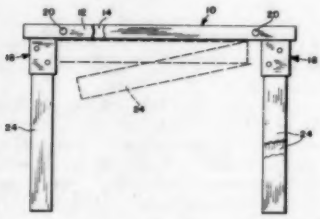
FOLDING SAW-HORSE

Alban M. Boudreau, 649 Rollstone St., Fitchberg, Mass. 01420

Filed Oct. 17, 1989, Ser. No. 422,534

Int. Cl.[5] B27B *21/00*; B25H *1/06*

U.S. Cl. 182—155 **8 Claims**



1. A folding saw-horse comprising a back and a pair of supporting legs secured to the back adjacent each end of the saw-horse,

a bracket for each pair of legs, each bracket comprising means to attach the same to the back in swinging relation, each bracket including a pair of plates for attachment to a separate leg in a diverging relation terminating in spaced free ends for the legs,

each bracket being a single one-piece integral part; the leg attaching and swinging means being fixed to the plates, and the plates being divergent inter se, to hold the legs in their fixed, divergent relation at all times,

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4,926,967

FOLDING LADDERS

Baker Mervyn R., 12 Bowen Close, Prestbury Cheltenham, Gloucestershire; Raymond J. Pearson, 4 The Orchard, Ham Road, Charlton Kings, Cheltenham, Gloucestershire, and Roger Emsley, Woodpeckers, Ash Lane, Down Hatherley, Gloucestershire, all of England

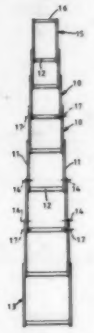
Filed Jan. 10, 1989, Ser. No. 295,383

Claims priority, application United Kingdom, Jul. 27, 1988, 8817934

Int. Cl.[5] E06C *1/383, 1/52*

U.S. Cl. 182—164 **10 Claims**

1. A folding ladder comprising a series of modules, each module including a pair of spaced, parallel stile sections connected together by a transverse tread section, the modules being of decreasing size and each module, except for the largest one, being pivotally mounted between the stile sections of the next adjacent larger module, so as to be foldable between an extended position and a folded position in which the smaller module is nested within the larger module, releasable locking means being provided to lock each module in the extended position, characterised in that the tread and stile sections are hollow, and in that the transverse tread section of each module is connected to each of its associated stile sections by a separately formed joint member, one end of which projects into the



hollow stile section and is secured thereto, and the other end of which projects into the hollow tread section and is secured thereto.

4,926,968

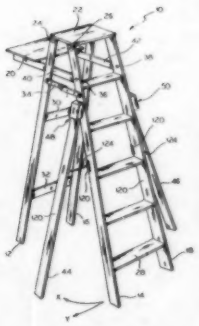
LADDER SUPPORTS

Leroy F. Schumer, Rte. 1, #1627, Perryville, Mo. 63775

Filed Sep. 19, 1989, Ser. No. 409,070

Int. Cl.[5] E06C *5/36*

U.S. Cl. 182—172 **8 Claims**



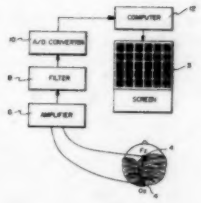
1. A ladder comprising at least first and second legs with a plurality of steps or rungs therebetween for bearing the weight of a person standing thereon, a brace leg pivotally attached to each of said weight bearing legs, means for providing said pivotal attachment by enabling said brace leg to swing into a spread and generally vertical position when said ladder is in a weight supporting position, said spread position being with said brace swung horizontally outward from the weight bearing leg of said ladder to provide sway bracing for said ladder, means for limiting said outward movement of said brace leg away from said weight bearing legs, and compression spring means associated with said pivotal attachment and positioned on a side of said brace leg remote from said weight bearing leg, said horizontal swinging of said leg compressing and being opposed by said spring.

4,926,969

SENSORY-DRIVEN CONTROLLER

Geoffrey D. Wright, and Edmund Pirali, both of Baltimore, Md., assignors to NeuroSonics, Inc., Baltimore, Md.

Filed Nov. 18, 1988, Ser. No. 272,949
Int. Cl.[5] A61B 5/04
U.S. Cl. 128—731 16 Claims



1. A method for detecting the point of attention of a subject who is attending to a stimulus, comprising the steps of:

establishing a calibrated response template unique to the subject representing the correspondence between a stimulus and an evoked response;

providing a stimulus for evoking an EEG response in a subject;

detecting the EEG response evoked from the subject by the stimulus;

mathematically corelating the EEG response with the template to derive the template response that corresponds to the EEG response; and

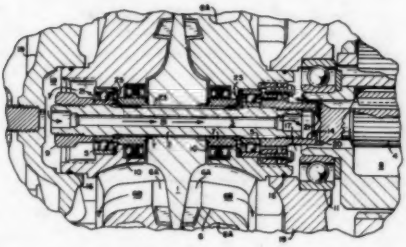
determining the point of attention of said subject from said mathematical correlation.

4,926,970

LUBE OIL SYSTEM FOR ROTATING MACHINERY

Robert R. Kimberlin, Athens, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Apr. 10, 1987, Ser. No. 335,545
Int. Cl.[5] F01M 1/00
U.S. Cl. 184—6.11 5 Claims



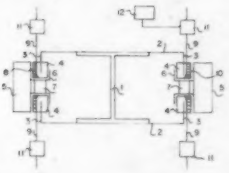
1. A circulating system for cooling and lubrication for a rotating machine having a rotor mounted on shaft means and a stator surrounding the rotor, said shaft means disposed for rotation within the stator on bearing means in a bore of the stator and said shaft means further including a central bore, a pinion having a hollow pinion shaft fixed about an end portion of said shaft means and in communication with said central bore, and radial path means between the interior and the periphery of said pinion shaft for centrifugally inducing flow through said central bore in said shaft in an axial direction towards one end of said shaft and means forming a path for circulating fluid from said radial path means at one end of said shaft means through said bearing means and about the outer periphery of said shaft means to the central bore at the opposite end of said shaft means.

4,926,971

ARRANGEMENT FOR LUBRICATING THE CHAIN GUIDE IN A DRAG CHAIN CONVEYOR FOR LOOSE ARTICLES

Walter C. Egger, Zurich, Switzerland, assignor to VT-Verpackungstechnik Zurich, Zurich, Switzerland

Filed May 4, 1984, Ser. No. 607,249
Claims priority, application Switzerland, May 4, 1983, 2421/83
Int. Cl.[5] B65G 45/02
U.S. Cl. 184—15.1 5 Claims



1. A drag chain conveyor comprising:

an endless conveyor chain having a plurality of spaced apart successive carriers thereon, each carrier having a holder portion;

guide rails having at least two planar surfaces, each planar surface being non-planar with respect to the remaining planar surfaces, the guide rails slidably supporting the carrier by the holder portion thereof, the guide rails being intermittently covered and uncovered as the spaced apart carriers slide over the guide rails, each guide rail having a channel therein and a plurality of bores extending from the channel in at least two non-parallel directions to at least two of the planar surfaces of the guide rail through which lubricant is supplied to the surfaces of the guide rail;

a lubricant supply connected to the channel by a pipe; and

a pressure-reducing metering valve operatively connected with the lubricant supply, the valve being adjusted so that the lubricant flows out of the bores substantially under zero pressure difference over the ambient pressure.

4,926,972

METHOD OF AND APPARATUS FOR INJECTING LIQUID INTO BOOT FOR JOINT UNITS

Hiroshi Yoshioka; Nobuyoshi Nagatsuma, and Shinobu Kobayashi, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 16, 1989, Ser. No. 324,529
Claims priority, application Japan, Mar. 18, 1988, 63-65537
Int. Cl.[5] F16C 1/24; B23P 11/00
U.S. Cl. 184—109 3 Claims

1. A method of injecting a liquid into a boot for a joint unit, the boot having a diametrically larger end fitted over an outer

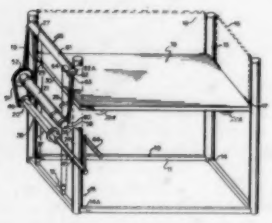
periphery of an open end of a joint unit assembled to an end portion of a shaft, and a diametrically smaller end closely fitted to the shaft, comprising: after the joint unit is assembled to the end portion of the shaft with the open end abutting on the diametrically larger end of the boot, conveying the shaft to a liquid injection station while held in vertical posture with said end portion facing upward, separating and holding the diametrically larger end of the boot from said open end, injecting the liquid into the boot, and then re-fitting the diametrically larger end over the outer periphery of said open end.

4,926,973

MOBILE WHEELCHAIR LIFT AND BRAKES THEREFORE

Dave W. Smith, 238 Scarboro Ave., S. W., Calgary, Alta., Canada (T3C 2H3)

Filed Dec. 9, 1988, Ser. No. 282,262
Int. Cl.[5] B66B *9/20*
U.S. Cl. 187—11 **20 Claims**



1. A mobile wheelchair lift comprising in combination a base frame, a vertically situated support structure extending upwardly from adjacent each end of said base frame, a substantially horizontal wheelchair platform, a winch assembly including a cable drum and a cable system operatively connected thereto, and supporting said platform between said support structure for elevating and lowering action within said support structure, said cable system including at least one upper pulley and at least one lower pulley, upper and lower pulley support means and a cable operatively extending between said cable drum and said upper and lower pulleys, and an automatic braking system cooperating between said winch assembly and said platform to prevent inadvertent descent of said platform, said braking system including at least one brake drum means operatively connected to said cable drum, brake means operatively connected to said brake drum means, and operating link means operatively extending between said upper pulley support means and said brake means to actuate said brake means, said upper pulley support means including a cam action therein for pivotally supporting same to said vertical support structure whereby the initiation of descent of said platform moves said link means to actuate said brake means.

4,926,974

ELEVATOR CAR WITH IMPROVED CAR DOOR CLUTCH

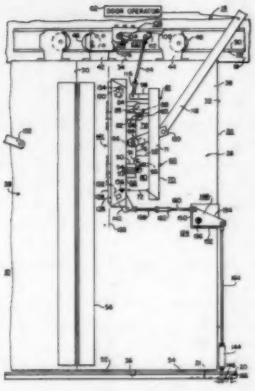
Arnold M. Morris, Chester Twp., Morris County; Daphne D'Zurko, Pompton Lakes; Richard H. Pilsbury, Demarest, all of N.J.; J. Warren Barkell, Jr., Penn Twp., Westmoreland County, Pa.; Karl B. Orndorff, Bonneauville Boro, Adams County, and Lawson Randall S., Gettysburg, both of Pa., assignors to Inventio AG, Hergiswil, Switzerland

Filed Feb. 13, 1989, Ser. No. 309,629
Int. Cl.[5] B66B *13/00*
U.S. Cl. 187—52 LC **13 Claims**

1. An elevator car having a cab which defines an opening, including a header and sill respectively disposed above and below the opening, a roller track fixed to the header, a car door having hanger rollers supported by the roller track, a door operator for imparting horizontal rectilinear motion to the car door, to open and close the opening, and a car door clutch carried by the car door having spaced "open" and "close" vanes for engaging hatch door rollers for simultaneous opening and closing of a hatch door with the car door, the improvement comprising:

first means associated with the card door clutch for selectively changing the spacing between the open and close vanes in response to a predetermined mechanical movement,

said first means including a parallelogram linkage assembly disposed to swing the close vane between first and second positions which provide first and second predetermined



spacings, respectively, between the open and close vanes, with the second predetermined spacing being less than the first predetermined spacing,

and second means directly responsive to the position of the elevator car door for providing said predetermined mechanical movement,

said second means including a cam and a cam follower arranged for relative movement in response to movement of the elevator car door, and for engagement when the elevator car door is closing the opening to the cab, with said engagement providing the predetermined mechanical movement which changes the spacing between the open and close vanes.

4,926,975

ELEVATOR CAR WITH IMPROVED DOOR LOCK

Arnold M. Morris, Chester Township, Morris County, N.J., assignor to Inventio AG, Hergiswil, Switzerland

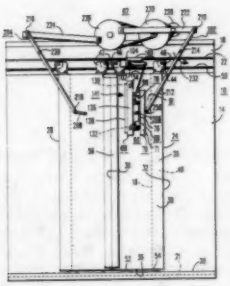
Filed Feb. 13, 1989, Ser. No. 309,630
Int. Cl.[5] B66B *13/00*
U.S. Cl. 187—57 **3 Claims**

1. An elevator car having a cab which defines an opening; a car door mounted for movement relative to the cab opening, between open and closed positions; a car door clutch carried by the car door having spaced open and close vanes for engaging hatch door drive rollers for simultaneously opening and closing a hatch door with the car door; a door operator having a door drive arm; and a door crank arm linking the door drive arm with the car door, the improvement comprising:

first means biased to a first position which prevents the door crank arm from moving beyond a predetermined dimension when the car door is closed, with the predetermined dimension being selected to limit car door opening such that passenger egress from the cab is prevented,

and second means responsive to he open vane contacting a

hatch door drive roller for moving the first means to a second position which allows the car door to be fully opened, with said open vane including a movable member responsive to engagement of the open vane with a hatch door roller,



and wherein the second means includes a post member fixed to the movable member of the open vane, with said post member being positioned to move the first means to the second position when the movable member of the open vane is moved by engagement of the open vane with a hatch door roller.

4,926,976

METHOD AND APPARATUS FOR THE CONTROL OF ELEVATOR CARS FROM A MAIN FLOOR DURING UP PEAK TRAFFIC

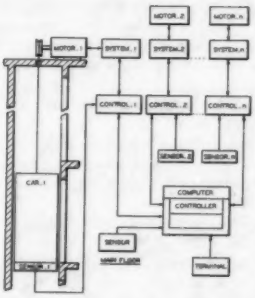
Joris Schroder, Lucerne, Switzerland, assignor to Inventio AG, Switzerland

Filed Dec. 20, 1988, Ser. No. 287,009

Claims priority, application Switzerland, Dec. 22, 1987, 05000/87

Int. Cl.[5] B66B *1/20*

U.S. Cl. 187—125 **36 Claims**



1. A method for the control of the dispatch of elevator cars. during up peak traffic conditions from a main floor. of an elevator group having at least one elevator. comprising the steps of:

a. detecting building filling passenger traffic arriving at a main floor by a first traffic measurement and detecting building.filling passenger traffic departing at the main floor by a second traffic measurement;

b. creating data fields by storing predetermined data related to transport capacities. nominal departure loads and nominal time intervals calculated according to an algorithm;

c. establishing nominal values of a departure load variable and a time interval variable dependent on said first and second traffic measurements and dependent on said predetermined data stored in said data fields and calculated according to said algorithm; and

d. comparing an actual value of a departure load for each elevator car with said nominal departure load variable value established in said step c . and comparing an actual time interval with said nominal time interval variable value established in said step c. and, upon at least one of said actual values reaching said compared nominal value. dispatching an associated elevator car from the main floor.

4,926,977

DISK BRAKE ASSEMBLY FOR WHEELS OF LAND MOTOR VEHICLES

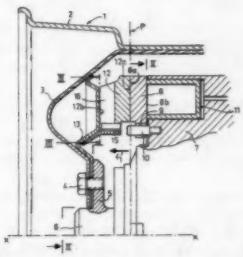
Alain L. Gassiat, Montussan, France, assignor to Carbone Industrie, Bagnolet Cedex, France

Filed May 12, 1988, Ser. No. 193,082

Claims priority, application France, May 13, 1987, 8707010

Int. Cl.[5] B60T *1/06*; F16D *65/78*

U.S. Cl. 188—18 A **6 Claims**



1. A disk brake assembly for a land vehicle wheel of the type including a rim and a run-out, the assembly comprising:

(a) a stationary hub carrier;

(b) a rotary hub supported within the hub carrier;

(c) a single annular rotor disk formed of carbon material, the rotor disk including a first friction face and a second face, the first friction face facing a stator disk and the second face defining a plurality of ventilation grooves;

(d) a single annular stator disk formed of carbon material slidably mounted on the hub carrier including a second fiction face having an area substantially equal to that of the first friction face;

(e) hydraulic piston means carried by the hub carrier for urging the second friction face of the stator disk against the first friction face of the rotor disk; and,

(f) a counter-thrust plate mounted on the rotary hub and laterally slidably supporting the single annular rotor disk, the counter-thrust plate having a portion adapted to bear against the second face of the rotor disk so as to counteract forces exerted on the rotor disk by the stator disk.

4,926,978

FRICTION PAD FOR USE WITH DISC BRAKE

Katsuhiro Shibata; Yuichi Azuma; Masao Inoue, and Shinichiro Okumura, all of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

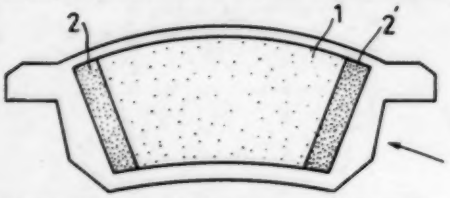
Continuation of Ser. No. 356,929, May 25, 1989, abandoned. This application Jun. 2, 1989, Ser. No. 360,871

Int. Cl.[5] F16D *69/02*

U.S. Cl. 188—73.1 **3 Claims**

1. A friction pad for use with a disc brake having a rotary disc sandwiched between a pair of friction pads and gripped thereby for braking, said friction pad comprising a central main portion and a peripheral portion made of different matrices having different compositions and arranged in the direction of

rotation of the disc; the ratio of area of the matrix of said central main portion to that of the matrix of said peripheral portion being between 10:5 and 10:0.5; both said central main portion and said peripheral portion containing an organic or inorganic fiber such as aramid fiber and glass fiber, a binder such as phenol resin, and an organic or inorganic filler such as cashew resin, carcium carbonate and graphite, but not containing asbestos or lead or lead compound except for lead sulfide; the matrix of said central main portion containing at least one of a substance having a Knoop or Micro-Vickers hardness of not less than 600 and a Moh's hardness of not less than 6 and steel in the form of powder, granule, chip or fiber, the content of said substance or said steel in the matrix of said peripheral portion being either zero per cent by volume, or not more than



90 per cent by volume if the substance or steel in the matrix of said peripheral portion is the same as the substance or steel in the matrix of said central main portion; the sum of values for said peripheral portion calculated by use of the following formula being approximate to, or less than, the sum of values for said central main portion

the sum of Knoop or Micro-Vickers hardness of each substance or steel multiplied by content thereof per unit volume

if said substance or steel in the matrix of said peripheral portion differs in hardness from said substance or steel in the matrix of said central main portion; other components in the matrix of said peripheral portion being similar to other components in the matrix of said central main portion.

4,926,979

DISK BRAKE OF A PIN TYPE

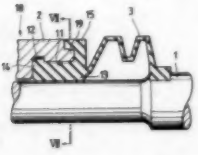
Seiya Odaka, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1989, Ser. No. 363,689

Claims priority, application Japan, Jul. 13, 1988, 63-91840[U]

Int. Cl.[5] F16D 65/00

U.S. Cl. 188—73.44 **3 Claims**



1. A disc brake of a pin type, comprising:

a boss member provided on one of a caliper of the disc brake and a support member fixed to a stationary portion of a vehicle;

a guide pin slidably mounted in said boss member, said guide pin being fixed to the other one of said caliper and said support member; and

means for damping and sealing ssid boss member, said means being disposed between said boss member and said guide pin, said means being formed of an elastic material, said damping and sealing means being provided at one end thereof with a thickened portion and a seal portion, said thickened portion having an outer diameter substantially equal to an inner diameter of one end of said boss member, said thickened portion being press-fitted in between said boss member and said guide pin, said seal portion being substantially tubular and formed integral with said damping and sealing means, said seal portion being disposed radially outwardly of said thickened portion in surrounding relation to said thickened portion, said seal portion being fitted on said outer surface of said boss member.

4,926,980

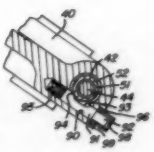
AUTOMATIC BRAKE ADJUSTING MECHANISM

James C. Cumming, Pleasant Ridge, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 681,164, Dec. 13, 1984, abandoned, which is a continuation of Ser. No. 629,013, Jul. 9, 1984, abandoned, which is a continuation of Ser. No. 556,805, Dec. 1, 1983, abandoned, which is a continuation of Ser. No. 273,537, Jun. 15, 1981, abandoned. This application Jun. 3, 1985, Ser. No. 740,157

Int. Cl.[5] F16D 65/60, 65/54

U.S. Cl. 188—79.55 **2 Claims**



1. A brake adjusting mechanism for a vehicle brake assembly having a movable brake shoe (16) with a friction lining (17) adapted to engage a surrounding brake drum (15);

a housing (40) having a first bore (42);

a ratchet member (51) slidably and rotatably mounted in said first bore (42), said ratchet member (51) having helical teeth about a generally cylindrical outer surface thereof and a threaded connection with means (44) operative to position the brake shoe relative to the surrounding brake drum (15);

a second bore (90) in said housing (40) and communicating with said first bore (42);

an elongate element (91) mounted for rectilinear movement in said second bore (90), said elongate element (91) having a pawl (94) engaged with said helical teeth of said ratchet member (51); and

means biasing (95) said pawl into engagement with said ratchet member (51);

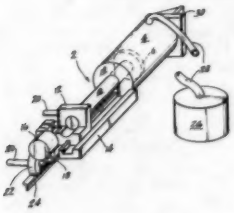
characterized in that one end (92) of said elongate element (91) extends out of said second bore (90); in that said second bore (90) traverses said first bore (42), an intermediate portion of said elongate element (91) traverses said ratchet member (52), said pawl is disposed on one side of said ratchet member (52) and said one end (92) of said elongate element (91) is disposed on the other side of said ratchet member (52), said pawl (94) being formed as an integral part of said elongate element (91) and said means biasing said pawl comprises a spring (95) seated at one end against an abutment internal of said second bore (90) and seated at the other end against said elongate element (91), and in that said pawl is adapted to be disengaged from said ratchet member (52) by manually pressing on said one end (92) of said elongate element (91) to move said elongate element (91) against said biasing means (95).

4,926,981

ESCALATOR STEP BUFFER

Klaus Bruehl, Hanover, and Dietmar Thaler, Seggebruch, both of Fed. Rep. of Germany, assignors to Otis Elevator Company, Farmington, Conn.

Filed Jun. 19, 1989, Ser. No. 368,476
Int. Cl.[5] B66T *17/18*
U.S. Cl. 188—111 **6 Claims**



1. A buffer assembly for emergency stopping of escalator steps in the event of escalator malfunction, said buffer assembly comprising:

a) a cylinder assembly for holding a buffering fluid, said cylinder assembly comprising an outer cylinder housing and an inner sleeve contained in said housing, said sleeve being inwardly spaced from said housing to form an annular space therebetween;

b) a fluid reservoir apart from said cylinder assembly, said reservoir being connected to said annular space by first conduit means;

c) a piston slideably telescoped into said sleeve and reciprocally movable therein, said piston including a piston rod extending from said cylinder assembly;

d) a catch mounted on said piston rod and normally disposed adjacent to but out of a path of movement of a step component of the escalator;

e) means for moving said catch to a step component-engaging position responsive to escalator malfunction whereupon said piston is driven into said sleeve; and

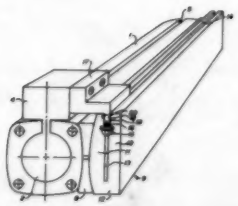
f) said sleeve being provided with at least two different adjacent gradients of fluid jets for bleeding fluid from said sleeve into said annular space operable to provide staged braking of said piston in said sleeve whereby the escalator will stop within a predetermined distance after engagement by said catch irrespective of the load on the escalator.

4,926,982

BRAKING DEVICE IN AN ARRANGEMENT FOR LINEAR MOVEMENT

Bo Granbom, Södergatan 5, S-736 00 Kungsör, Sweden

Filed Dec. 15, 1988, Ser. No. 287,850
Int. Cl.[5] F15B *15/08*
U.S. Cl. 188—271 **8 Claims**



1. A braking arrangement for a rodless piston, comprising:

housing means defining a cylinder having a longitudinally elongated, enclosed chamber receiving a rodless piston which is longitudinally shorter than said chamber and capable of being moved longitudinally of the cylinder in the chamber throughout a stroke in a stroke direction;

fluid pressure means selectively communicating with said chamber for moving said piston longitudinally of the cylinder in said stroke direction;

dog means effectively connecting with said rodless piston for movement therewith along said stroke, said dog means having a portion which is physically accessible from externally of said cylinder;

at least one first braking surface provided on said housing means and having a length longitudinally of said housing means which is at least as long as the maximum length of said stroke;

at least one second braking surface provided on said portion of said dog means so as to be engageable with said at least one first braking surface throughout the length of said stroke; and

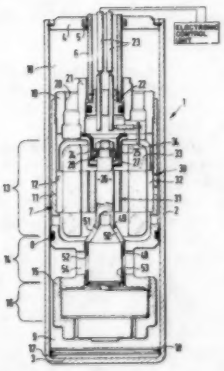
means operable for moving at least one of said first and second braking surfaces towards and away from one another, generally transversally of said cylinder, into and out of braking engagement with one another, respectively for stopping said rodless piston at an intended position along said stroke, and freeing said rodless piston to be moved along said stroke in said stroke direction.

4,926,983

HYDRAULIC SHOCK ABSORBER

Bernd Taubitz, Schwieberdingen; Peter Zieher, Eberdingen; Claus Kramer; Kurt Engelsdorf, both of Besigheim, and Armin Schuelke, Ludwigsburg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 300,872
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805934
Int. Cl.[5] F16F *9/46*; F16K *31/02*
U.S. Cl. 188—299 **23 Claims**



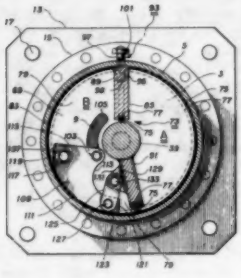
1. A hydraulic shock absorber having an automatically adjustable damper force, which comprises a cylinder (2), a damper piston (7) that is axially movable in said cylinder, said damper piston divides said cylinder interior into two chambers (9, 10) and has a controllable flow across section, a piston rod (6) connected to said damper piston within said cylinder and protruding to the outside through one end of said cylinder, a control slide (14) including at least two solid sections and at least two oppositely disposed sections having a plurality of radial openings, a fixed hollow cylinder slide surrounding said control slide (14) and provided with a plurality of radial openings (54) relative to said control slide (14), an electromagnetic rotary adjuster (13) within said piston for controlling said

control slide for monitoring at least two flow cross sections, said electromagnetic rotary adjuster (13) is a permanently excited single-winding rotary adjuster having a maximum adjusting range of 30°, and a magnetic safety resetting.

4,926,984
HYDRAULIC SHOCK ABSORBER WITH NONLINEAR PROPERTIES

Gary M. Pollitt, 45050 Cameron Rd., Temecula, Calif. 92390

Filed Jan. 12, 1989, Ser. No. 364,967
Int. Cl.[5] F16F 9/12
U.S. Cl. 188—310 **12 Claims**



1. An hydraulic shock absorber comprising:

(a) a fluid-filled shock absorber chamber bounded by cylindrical walls and opposed, spaced-apart first and second chamber end plates including first means for anchoring said chamber to a frame;

(b) a freely rotating shock absorber center shaft axially positioned in said chamber pivotally received in said first chamber end plate;

(c) an operating shaft coaxially aligned with said center shaft in said chamber passing out through said second chamber end plate including second means for connection to a separate oscillatory member;

(d) a work disk pivotally mounted inside said chamber intermediate said first and second end plates, in fluid sealing relationship with said cylindrical walls and fastened securely to said operating shaft;

(e) a baffle fixedly mounted inside said chamber in fluid-sealing relationship therein having at least one aperture formed therethrough;

(f) a wiper vane mounted on said center shaft intermediate said disk and said first end plate extending outward into fluid-sealing relationship against said chamber walls, said vane, work disk and said first end plate effectively dividing said chamber into first and second subchambers, so that rotation of said center shaft forces fluid from said first subchamber through said aperture into said second subchamber;

(g) a first pivot pin extending from said second end plate, through a circumferential slot formed in said work disk, into said chamber;

(h) a second pivot pin, spaced-apart from said first pivot pin, extending from said work disk into said chamber;

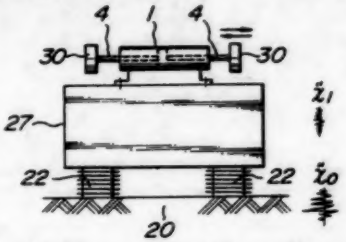
(i) a lug pivotally received on said first pivot pin and slidingly received on said second pivot pin having an arm extending outward around the inside of said chamber walls to a distal end adjacent said chamber walls when said vane is in a first position apart from said fixed baffle and said first pivot pin is at one end of said slot; and,

(j) a moveable link pivotally attached between said distal end of said lug and said vane for urging said vane through said fluid causing said lug to pivot about said first pivot pin and rotate said work disk about said chamber walls to provide variable fluid flow from said first subchamber to said second subchamber as a nonlinear function of operating shaft rotation.

4,926,985
OSCILLATING APPARATUS FOR DAMPING VIBRATION

Keiichiro Mizuno, Tokyo; Kazuyoshi Iida, and Kazutomo Murakami, both of Yokohama, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Oct. 24, 1988, Ser. No. 261,213
Claims priority, application Japan, Nov. 2, 1987, 62-275619
Int. Cl.[5] F16F 7/10, 15/03; F16M 1/00
U.S. Cl. 188—378 **8 Claims**

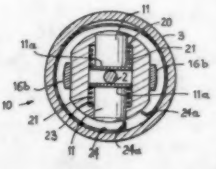


1. An oscillating apparatus comprising: a cylinder, a piston reciprocatingly movably fitted in the cylinder, shaft members connected to the piston and at least one shaft member extending out of the cylinder, said cylinder, piston and shaft members forming an oscillator, said oscillator arranged on an object to be damped which is supported through laminated elastic members on a base, and weights are fixed to ends of the shaft members extending out of the cylinder, an inlet and an outlet for an electro-rheological fluid provided at each of two cylinder chambers defined in said cylinder by the piston, and voltage applying means for applying electric voltage to the electro-rheological fluid passing through said inlets and outlets, respectively, so that applications of the voltage to the inlet of one cylinder chamber and the outlet of the other cylinder chamber are simultaneously effected and applications of the voltage to the inlets of both the cylinder chambers are alternately effected.

4,926,986
CENTRIFUGAL CLUTCH FOR AN ACTUATOR FOR RENDERING INOPERATIVE AN AUTOMOBILE VEHICLE DOOR LATCH

Jean P. Noel, Saint Die, France, assignor to Rockwell-CIM, France

Filed Dec. 9, 1988, Ser. No. 282,159
Claims priority, application France, Dec. 14, 1987, 87 17423
Int. Cl.[5] F16D 11/06
U.S. Cl. 192—0.02 R **6 Claims**



1. A centrifugal clutch for an actuator for rendering an automobile vehicle door latch inoperative, said clutch being interposed between and combined with an electric motor and a gear train drivingly connected to a screw on which is mounted a tapped sleeve for controlling an element for render-

ing said latch inoperative, said motor having an output shaft, said clutch comprising: a bell element, at least one weight disposed in the bell element radially of the output shaft of the motor, elastically yieldable return means associated with the weight for biasing the weight to a de-clutched position of rest, the weight being capable of being driven by centrifugal force created by rotation of the shaft of the motor to a clutching position where said weight drives said bell element, the bell element being provided with a gear wheel drivingly connected to said gear train and the weight being mounted in a support comprising a hub having substantially axially aligned branches surrounding the weight and defining a cavity for the weight, a cover closing said cavity and fixed to the hub, said cover and said hub allowing radial displacement of the weight toward the bell element under the effect of centrifugal force, said bell element having an inner wall and a stressed spring in said bell element and frictionally engaging the inner wall of the bell element, said spring having at least one clutch dog positioned for engagement with said weight in said clutching position, whereby said spring is operative to rotatably drive said bell element and said gear-wheel by friction contact with said inner wall of the bell element when the weight engages said clutch dog in said clutching position and to slip on said internal wall of the bell element when rotation of said bell element is suddenly stopped.

4,926,987

ONE-WAY TRANSMISSION DEVICE

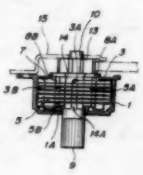
Mikio Hosma, Yokohama, Japan, assignor to Ohi Seisakusho Co., Ltd., Yokohama, Japan

Filed Oct. 24, 1988, Ser. No. 261,153

Claims priority, application Japan, Jan. 13, 1987, 63-3870; Oct. 28, 1987, 62-270295

Int. Cl.[5] F16D *51/04*

U.S. Cl. 192—8 C **9 Claims**



1. A one-way transmission device comprising:

a housing having a cylindrical inner wall formed therein;

a first coil spring coaxially receiving in said housing and resiliently pressed at its outer periphery against said cylindrical inner wall, said first coil spring having first and second ends which are bent radially inwardly;

a second coil spring coaxially received in said housing beside said first coil spring, said second coil spring being pressed at its outer periphery against said cylindrical inner wall, said second coil spring having first and second ends which are bent radially inwardly;

an annular core coaxially and rotatably received in the coaxially arranged first and second coil springs and having at a peripheral portion thereof a sectoral recess into which said first and second ends of said first and second coil springs are received, said sectoral recess being defined by circularly spaced first and second walls;

input and output shafts respectively connected to axially opposed sides of said annular core to rotate therewith;

an output member including a base portion having a bore through which said output shaft passes and a pawl projecting into said sectoral recess, said pawl having a slit with which said first end of said first coil spring is engaged; and

said first end of said second coil spring is arranged between said first wall of said sectoral recess and said pawl, and in which said second ends of said first and second coil springs are each arranged between said second wall of said sectoral recess and said pawl.

4,926,988

HYDRODYNAMIC CLUTCH

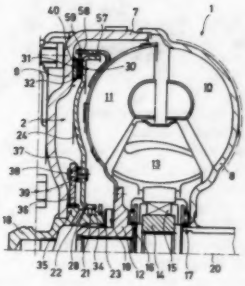
Wolfgang Kundermann, Schweinfurt, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Jul. 5, 1989, Ser. No. 375,815

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1988, 3823210

Int. Cl.[5] F16D *33/00*

U.S. Cl. 192—3.3 **16 Claims**



1. A hydrodynamic clutch, especially hydrodynamic torque converter, comprising,

a casing (7) rotatably driven about an axis of rotation (20) and having a drive-side casing wall (9) and a drive-remote casing wall (8),

a pump wheel (10), firmly connected to the drive-remote casing wall (8),

a turbine wheel (11), rotatably mounted relative to the casing (7) about the axis of rotation (20) between the pump wheel (10) and the drive-side casing wall (9),

a bridging clutch (2; 3; 4; 5; 6) in the casing (7) between the turbine wheel (11) and the drive-side casing wall (9), said bridging clutch (2; 3; 4; 5; 6) comprising a guide hub (18) axially fixedly connected with the drive-side casing wall (9),

a piston (24, 25; 26; 27) which is axially slidably guided in its radially inner zone on the guide hub (18) concentric to the axis of rotation (20) and is guided torsionally fixed relative to the casing (7) and is sealed relative to the guide hub (18),

a stop (23) on the guide hub (18) for limiting the axial sliding movement of the piston (24; 25; 26; 27) relative to the drive-side casing wall (9) towards the turbine wheel (11),

a first friction surface (30) in the radially outer zone of the piston (24; 25; 26; 27),

a second friction surface (31) on the drive side-casing wall (9) opposite the first friction surface,

at least one friction disc (32, 33) disposed between the first and the second friction surfaces (30, 31), which friction disc is in torque-fixed connection in the region of its outer circumference with the turbine wheel (11),

and means for alternately subjecting a space between the drive-side casing wall (9) and the piston (24; 25; 26; 27) on the one hand, and a space between the drive remote casing wall (8) and the piston (24; 25; 26; 27) on the other hand to pressurized fluid for the purpose of opening and closing the bridging clutch (2; 3; 4; 5; 6).

4,926,989

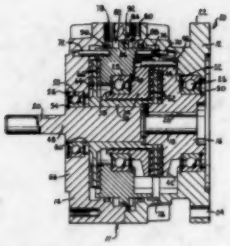
ENCLOSED DRY CLUTCH/BRAKE

Rodney D. Brantz, Valley Center, Kans., assignor to The Carlson Company, Inc., Wichita, Kans.

Continuation-in-part of Ser. No. 185,552, Apr. 25, 1988, abandoned. This application Jul. 21, 1989, Ser. No. 383,369

Int. Cl.[5] F16D 67/02

U.S. Cl. 192—18 A 18 Claims



1. A clutch/brake unit comprising:

a closed stationary housing;

an input hub supported in the housing for rotation and adapted to be driven rotatively;

an output shaft supported in the housing for rotation;

a brake disk having opposing surfaces each carrying a friction brake lining thereon;

a clutch disk having opposing surfaces each carrying a friction clutch lining thereon;

a rotor carrying said brake disk and said clutch disk thereon, said rotor having a spline connection with said output shaft to mount said brake disk and clutch disk on the output shaft for rotation therewith;

a double acting piston mounted in said housing for axial movement in opposite first and second directions respectively toward the brake disk and the clutch disk;

said piston acting upon movement thereof in said first direction to effect application of frictional force to both friction brake linings in a manner to frictionally brake the output shaft and said piston acting upon movement thereof in said second direction to effect application of frictional force to both friction clutch linings in a manner to frictionally couple the input hub with the output shaft for driving of the latter;

means for applying fluid pressure to said piston in a manner to move the piston in said second direction; and

means for moving said piston in said first direction.

4,926,990

CLUTCH FOR FRANKING MACHINE

Manfred Schleuchardt, Offenbach am Main, Fed. Rep. of Germany, assignor to Francotyop-Postalia GmbH, Berlin, Fed. Rep. of Germany

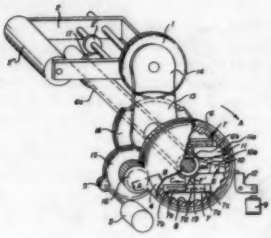
Continuation of Ser. No. 77,027, Jul. 20, 1987, abandoned, which is a continuation of Ser. No. 837,563, Mar. 3, 1986, abandoned, which is a continuation of Ser. No. 516,785, Jul. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 176,046, Aug. 7, 1980, abandoned. This application Mar. 3, 1989, Ser. No. 319,898

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1979, 2932427

Int. Cl.[5] F16D 11/02

U.S. Cl. 192—28 4 Claims

1. In a franking machine having a drive, a transport mechanism, and a control cylinder, a non-slipping overrunning latch-type clutch disposed between the drive and transport mechanism and between the drive and control cylinder for triggering printing in franking machines, comprising a shaft, a locking wheel being mounted on said shaft and engaged by the drive, internal gearing having an odd number of teeth formed on said locking wheel, a bushing being disposed on said shaft and connectible to the transport mechanism and control cylinder, a locking gear disposed on said bushing adjacent said locking wheel, teeth disposed on part of the periphery of said locking gear, at least one pawl being disposed in said locking gear and extended into a hollow space formed in said locking wheel for engaging said internal gearing, a lever disposed on said bushing adjacent said locking gear, at least one finger being integral



with said lever and engageable with said at least one pawl, a torsion spring for rotating said lever and at least one finger to push said at least one pawl into said internal gearing and couple said locking wheel and locking gear, and an electromagnetically controlled latch for preventing said lever from being rotated by said spring in a first position and for allowing said at least one finger to push said at least one pawl into said internal gearing in a second position, said locking gear being slipplessly rotated by the drive engaging said locking wheel after initial rotation of said locking wheel.

4,926,991

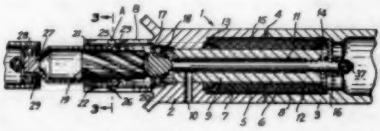
ACTUATED SPRING CLUTCH ASSEMBLY

Robert A. Stone, Sandy Hook, and Jules G. Kish, West Haven, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 21, 1988, Ser. No. 288,410

Int. Cl.[5] F16D 11/06, 13/06

U.S. Cl. 192—41 S 9 Claims



1. A spring clutch assembly having an input clutch member, an output clutch member, the input and output members having bores extending therethrough, each member being separably rotatable; an arbor extending through the bores in both members; a clutch spring placed on the arbor, each member having a drive surface engageable by the spring; the spring clutch assembly further comprising:

a shaft, disposed in a passage in the arbor, the shaft extending through the arbor and being rotatable therein;

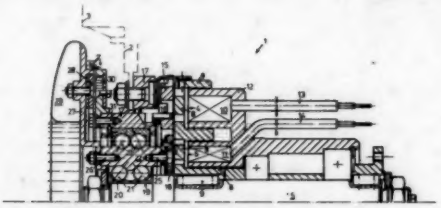
spring engagement means fixed to the shaft for engaging the spring;

rotating means, engaged to the shaft, for rotating the shaft relative to the arbor in response to a control signal.

4,926,992
ELECTROMAGNETICALLY OPERABLE FRICTION-DISK CLUTCH

Karl-Heinz Linnig, Kapitän Wagnerstrasse 34, 7990 Friedrichshafen, Fed. Rep. of Germany

Filed Nov. 17, 1988, Ser. No. 275,771
Claims priority, application Fed. Rep. of Germany, Nov. 21, 1987, 3739537
Int. Cl.[5] F16D *27/08*
U.S. Cl. 192—48.2 10 Claims



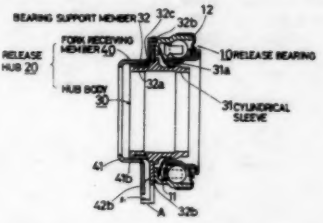
1. A torque-transmitting assembly comprising
(a) a drive shaft adapted to be rotated by external power;
(b) an output member mounted on the shaft for rotation thereon;
(c) an eddy-current coupling mounted on said shaft for rotation thereon and including
(1) a rotatable driving member;
(2) a rotatable driven member being unitary with said output member; and
(3) magnetic force-transmitting means for applying a driving torque from the driving member to the driven member upon rotation of the driving member;
(d) a ball bearing mounted on said shaft for rotation thereon and including
(1) a series of radially inner bearing balls;
(2) a series of radially outer bearing balls;
(3) an inner ring surrounded by said series of radially inner bearing balls and being seated on said shaft;
(4) an outer ring surrounding said series of radially outer bearing balls and supporting said output member; and
(5) a rotary intermediate ring extending between and being in a contacting relationship with the radially inner bearing balls and the radially outer bearing balls; the intermediate ring being affixed to said rotatable driving member of the eddy-current coupling; and
(3) a clutch mounted on said shaft and having an engaged state in which said clutch maintains a torquetransmitting connection between said shaft and said intermediate ring, whereby said shaft drives the rotatable driving member of said eddy-current coupling through said clutch and said intermediate ring; said clutch further having a disengaged state in which said torque-transmitting connection between said shaft and said intermediate ring is absent.

4,926,993
RELEASE BEARING UNIT

Hirotaka Kusumoto, and Toshihiko Shiraki, both of Osaka, Japan, assignors to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Mar. 18, 1988, Ser. No. 170,334
Claims priority, application Japan, Mar. 18, 1987, 62-64781
Int. Cl.[5] F16D *23/14*
U.S. Cl. 192—98 6 Claims

1. A release bearing unit comprising:
a release bearing; and
release hub means for receiving a release fork of a clutch, said release bearing being coupled to the circumference of said release hub means, said release hub means further comprising;
a hub body having a generally cylindrical sleeve and a bearing support member, said generally cylindrical sleeve having a longitudinal axis, said bearing support member having a cylindrical portion positioned on a side of said generally cylindrical sleeve and having a flange in contact with said release bearing, and
fork receiving means for engaging the release fork of the clutch, said fork receiving means being positionable on said cylindrical portion of said bearing support member and thereafter being retained relative thereto for preventing rotational and axial movement between said fork

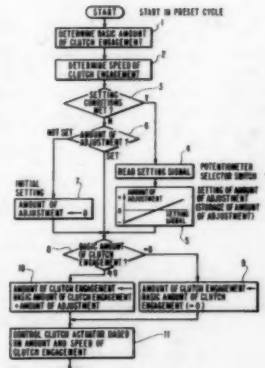


receiving means and said cylindrical portion of said bearing support member, said fork receiving means additionally having at least one projection portion defining a clearance between said fork receiving means and the flange of the bearing support member when said fork receiving means is positioned on said cylindrical portion of said bearing support member.

4,926,994
AUTOMATIC CLUTCH CONTROL APPARATUS

Toshifumi Koshizawa, Kawasaki; Kiyomi Ohkawa, Fujisawa, and Teruhiko Horiuchi, Yokohama, all of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

Continuation of Ser. No. 95,649, Sep. 14, 1987, abandoned. This application Sep. 12, 1989, Ser. No. 406,809
Claims priority, application Japan, Sep. 13, 1986, 61-216426
Int. Cl.[5] F16D *25/14*; B60K *41/28*
U.S. Cl. 192—110 R 7 Claims


START
START in PRESET CYCLE
DETERMINE BASIC AMOUNT OF CLUTCH ENGAGEMENT
DETERMINE SPEED OF CLUTCH ENGAGEMENT
SETTING CONDITIONS MET?
NOT SET
AMOUNT OF ADJUSTMENT?
SET
READ SETTING SIGNAL
POTENTIOMETER SELECTOR SWITCH
INITIAL SETTING
AMOUNT OF ADJUSTMENT = 0
SETTING OF AMOUNT OF ADJUSTMENT
STORAGE OF AMOUNT OF ADJUSTMENT
BASIC AMOUNT OF CLUTCH ENGAGEMENT = 0?
AMOUNT OF CLUTCH ENGAGEMENT = BASIC AMOUNT OF CLUTCH ENGAGEMENT + AMOUNT OF ADJUSTMENT
AMOUNT OF CLUTCH ENGAGEMENT = BASIC AMOUNT OF CLUTCH ENGAGEMENT (= 0)
CONTROL CLUTCH ACTUATOR BASED ON AMOUNT AND SPEED OF CLUTCH ENGAGEMENT
END

1. An automatic clutch control apparatus for controlling a clutch actuator for engaging and disengaging a clutch on a vehicle, comprising:
means for automatically determining a basic amount of engagement of the clutch from a position to start engaging the clutch based on operating conditions of the vehicle;
means for manually setting an amount of fine adjustment of

the automatically determined amount of engagement of the clutch; and

control means for controlling an amount of engagement of the clutch based on the automatically determined basic amount of engagement and the manually set amount of fine adjustment.

4,926,995

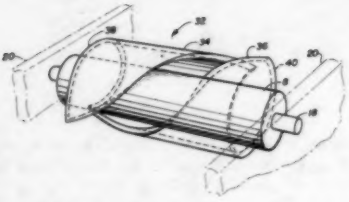
SEPARABLE ROLLER SLEEVE

Kenneth A. Kauffman, York, Pa., assignor to KRB Machinery Co., York, Pa.

Filed Sep. 26, 1988, Ser. No. 249,106

Int. Cl.[5] B65G 13/00

U.S. Cl. 193—37 4 Claims



1. In combination with a typical roll conveying machine having a plurality of conveyor rollers, a separable roller sleeve adapted to be twistably opened and oriented manually for encloseable installation upon a bare conveyor roller of said typical roll conveying machine said separable roller sleeve comprising, a relatively thick walled resilient tubular member of uniform construction throughout having a length with opposite longitudinal ends and an interior cross-sectional diameter closely complementary but oversize to that of said bare conveyor roller by such an amount so as to provide a mechanically loose fitting disposition therebetween, and an unimpeded longitudinally extending compression closing spiral through-wall separation extending from one longitudinal end to the opposite longitudinal end thereof.

4,926,996

TWO WAY COMMUNICATION TOKEN INTERROGATION APPARATUS

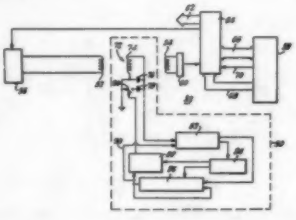
David Eglise, Windsor, and Adrian Lewis, Lymington, both of England, assignors to Mars Incorporated, McLean, Va.

Division of Ser. No. 678,509, Dec. 5, 1984, Pat. No. 4,674,618. This application Jun. 22, 1987, Ser. No. 64,877

Claims priority, application United Kingdom, Dec. 6, 1983, 8332443; Oct. 4, 1984, 8425079

Int. Cl.[5] G07F 7/10

U.S. Cl. 194—212 26 Claims



1. A token reading device for communicating with a data-storing token, said device comprising:

inductive coupling means for inductively coupling said reading device with said token, the inductive coupling means comprising transmitting antenna means for transmitting a signal to a token, said signal directly supplying power to said token;

signal generating means for generating and applying said signal to said antenna means, said signal generating means comprising means for modulating said signal in dependence on data to be transmitted to said token; and

data detection means coupled to said inductive coupling means for detecting changes in the transmitted signal caused by alterations of the impedance of said token, thereby detecting data transmitted by the token.

4,926,997

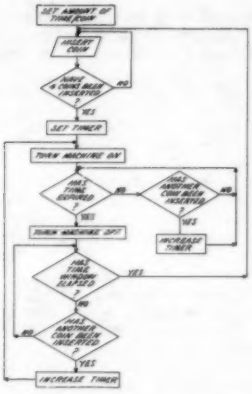
APPARATUS AND METHOD FOR RESTARTING A COIN OPERATED DEVICE AFTER EXPIRATION OF TIME

Donald O. Parker, 1003 Spring St., Grand Rapids, Mich. 49503

Filed Sep. 22, 1988, Ser. No. 247,705

Int. Cl.[5] G07F 17/20, 5/16

U.S. Cl. 194—231 18 Claims



1. In a coin operated device, an apparatus comprising, in combination,

means for accepting deposited coins;

means for activating the device in response to at least a first predetermined plurality of deposited coins for a full preset first time period responsive to said deposited coins and deactivating said device upon the end of said first time period; and

means for restarting said device for a second time period less than said first time period within a preset time window following expiration of said first time period in response to a deposit of less than said first predetermined plurality of coins.

4,926,998

COIN SENSER FOR PAY TELEPHONE

Jan P. Finegan, 2871 Parkridge Rd., Chamblee, Ga. 30319

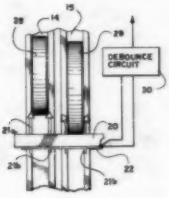
Filed Oct. 27, 1988, Ser. No. 263,410

Int. Cl.[5] G07D 5/08

U.S. Cl. 194—315 7 Claims

1. Coin detecting apparatus, in combination with a coin sorting device, said coin sorting device including means for receiving coins, means for sorting coins by denomination, and a plurality of chutes, each chute of said plurality of chutes receiving one denomination of coin, said coin detecting apparatus including an integral insulating block extending across said plurality of chutes in a position to be struck by the coins, a plurality of pins fixed to said block and extending upwardly

from said block into said chutes, and circuit means carried by said block and electrically connected to said pins, said pins having a sloped portion disposed within said chute for engagement by a coin, and an apex of said pins disposed beyond said chute so that a coin falling within said chute cannot engage said apex.



4,926,999

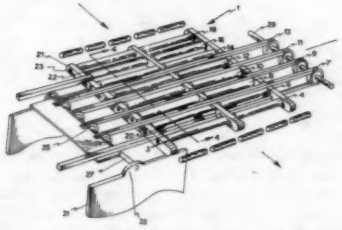
RIGHT ANGLE FLOW-THROUGH JUMP TRANSFER CONVEYOR SYSTEM

Frederick E. Fauth, Sr., Towson, and Paul E. Barkley, Sykesville, both of Md., assignors to American Bottlers Equipment Co., Inc., Owings Mills, Md.

Continuation of Ser. No. 129,189, Dec. 7, 1987, abandoned, which is a continuation-in-part of Ser. No. 76,183, Jul. 15, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 344,805

Int. Cl.[5] B65G *43/08*

U.S. Cl. 198—358 **21 Claims**



1. A right angle jump transfer for a conveyor system, said right angle jump transfer having a plurality of parallel rollers disposed in a planar array, comprising:

(A) a plurality of flexible strips interposed between said rollers each of said flexible strips being supported at its ends by a pair of end pulleys, said end pulleys being disposed outside the ends of said rollers;

(B) a first support member means supporting each of said plurality of flexible strips for tensioning, raising and lowering said strips, said first support member means being disposed between said pair of end pulleys and comprising:

(1) an elongated solid lubricant strip means to directly receive said flexible strip thereon,

(2) a shape d member directly mounted below said lubricant strip means, and

(3) a first actuator cylinder for moving the shaped members upwards or downwards, whereby said plurality of flexible strips are raised and lowered relative to and independent from said end pulleys;

(C) first driving means for driving said plurality of rollers;

(D) second driving means for driving said plurality of strips, at least one of each pair of said end pulleys being operably coupled to said second driving means; and

(E) first sensing means for detecting a predetermined condition in the flow of articles along said conveyor system on said right angle jump transfer.

4,927,000

CONVEYOR SYSTEM

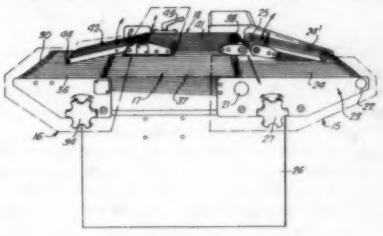
Trevor B. Hoyland, and Richard Payne, both of Norfolk, England, assignors to Thurne Engineering Co., Ltd., Norfolk, England

Division of Ser. No. 131,977, Dec. 10, 1987, Pat. No. 4,846,336. This application Jan. 6, 1989, Ser. No. 294,026

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1986, 3642123; United Kingdom, Aug. 12, 1987, 8719101

Int. Cl.[5] B65G *47/26*

U.S. Cl. 198—418.4 **6 Claims**



1. A conveyor system for positioning slices of meat or other foodstuffs by converting M input streams of products into N output streams of products where M is an integer greater than one and N is an integer less than M, said system comprising:

input conveyor means for conveying said M input streams;

output conveyor means for conveying said N output streams; and

at least one multi-element strip conveyor, said multi-element strip conveyor having:

an upstream input end;

a downstream output end;

lateral movement means to move laterally said downstream output end; and

a series of parallel conveying elements, said conveying elements being arranged to conform as said downstream end of said multi-element strip conveyor moves laterally, said upstream input end of said multi-element strip conveyor being arranged to receive products from an input stream on said input conveyor means, and said downstream end being arranged to deposit products into an output stream shifted laterally with respect to said input stream,

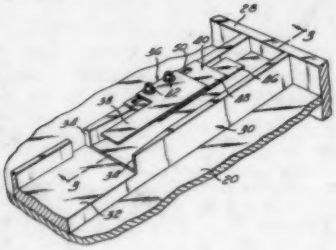
wherein said input conveyor means separates said input streams in a vertical direction, wherein said vertically separated input streams M are moved laterally by said multi-element strip conveyor such that said streams are overlapped, and wherein said multi-element strip conveyor includes at said upstream, input end, a grooved drive roller and, at said downstream end, grooved idler roller means both receiving said conveying elements of said strip conveyor, said idler roller means being movable laterally with respect to the drive roller by said lateral movement means and said conveying elements of said multi-element conveyor being elastic to accommodate changes in length between said idler roller means and said drive roller as said idler roller means is moved laterally.

4,927,001

ADJUSTABLE COMPONENT COVER PLATE FOR VIBRATING CONVEYOR

Ross D. Hendricks, Palos Verdes Peninsula, Calif., assignor to Excellon Automation, Torrance, Calif.

Filed Feb. 19, 1988, Ser. No. 157,930
Int. Cl.[5] B65G 47/00
U.S. Cl. 198—463.5 **15 Claims**



1. An apparatus for maintaining the orientation of a plurality of electronic components advancing toward a first predetermined location, said components adapted to be singularly lifted from said first predetermined location and moved to a second predetermined location, said apparatus comprising:

a feed tray having a trough, said trough having an upwardly facing surface adapted to provide a path for guiding said components toward said first predetermined location, said components being oriented in said trough in a plane substantially parallel to the plane of said upwardly facing surface;

a stop plate, located at one end of said feed tray, proximate to said first predetermined location, said stop plate adapted to retaining said components on said feed tray until they are subsequently lifted therefrom; and

a component cover plate extending across said trough for preventing said components from being canted within said trough, said cover plate comprising:

a flap which is positioned directly above and which at least partially overhangs a component disposed at a first predetermined location, said flap having sufficient flexibility to allow said component to be lifted from said feed tray past said flap, in a direction substantially perpendicular to the direction in which said components advance, yet being rigid enough to prevent canting of a component at said first predetermined location; and

a backing plate positioned directly above said flap so as to restrict deflection of said flap.

4,927,002

CONVEYOR CHAIN HAVING DETACHABLE MEMBER FOR CARRYING ARTICLES

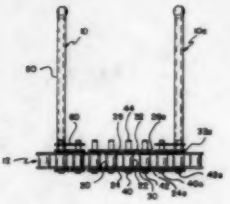
Charles G. Springman, Beech Grove, Ind., assignor to AMSTED Industries Incorporated, Chicago, Ill.

Filed May 10, 1989, Ser. No. 349,815
Int. Cl.[5] B65G 17/12
U.S. Cl. 198—487.1 **16 Claims**

1. An improved article carrying member for detachable mounting to link pin ends protruding from a roller type chain conveyor, said member comprising:

a shaft with a socket at one end adapted to be press fitted onto a first link pin; and

a supplemental link plate secured to said shaft spaced from said one end, said supplemental link plate having an opening, said opening being of a size and spaced from said shaft sufficient to be press fitted to a second link pin adjacent to said first link pin, whereby both said socket and said supplemental link plate will be readily separable from said first and second link pins upon excessive load or impact on said shaft.

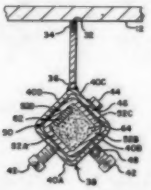


4,927,003

HEATED CONVEYOR BELT CLEANER

Robert T. Swinderman, Kewanee, and David W. Mueller, Neponset, both of Ill., assignors to Martin Engineering Company, Neponset, Ill.

Filed Jun. 2, 1989, Ser. No. 360,444
Int. Cl.[5] B65G 45/10
U.S. Cl. 198—497 **7 Claims**



1. A heated conveyor belt cleaner including a support shaft positioned adjacent the belt to be cleaned and generally transverse to its direction of travel, heating means including an electrical resistance heating element disposed internal to said shaft said heating element adapted to generate heat within said shaft and to thereby heat said shaft, at least one mounting sleeve slidably supported on said shaft for mounting a belt scraper element, at least one belt scraper element adapted to be positioned in contact with said belt to be cleaned and connectable to said mounting sleeve and, through said mounting sleeve, to said shaft such that heat generated by said heating element within said shaft is communicated from said shaft through said mounting sleeve to said scraper element to heat said element for effective removal of adherent materials from said conveyor belt.

4,927,004

FEEDER

Timothy H. Leaton, Ascot, Great Britain, assignor to Etablissement Gersan, Vaduz, Liechtenstein

Filed Mar. 2, 1988, Ser. No. 163,004
Claims priority, application United Kingdom, Mar. 2, 1987, 8704830
Int. Cl.[5] B65G 17/36
U.S. Cl. 198—704 **11 Claims**

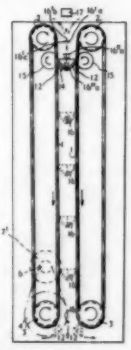
1. A feeder for single feeding of discrete objects at a predetermined spacing and at a predetermined velocity, the feeder comprising:

a series of spaced containers, each for receiving a single said object;

means constraining the containers to circulate in a closed

path comprising a feed section in which the containers descend substantially vertically through a substantial distance, at said predetermined spacing, the feed section having an upper end and a lower end;

driving means for driving the containers around said path whereby the containers descend in said feed section at said predetermined velocity; and



discharging means for discharging the object from each successive container at the lower end of said feed section without imposing any substantial lateral forces on the object during discharge; and

wherein each container includes a bottom which comprises generally planar openable parts whose lower portions are of generally triangular shape and co-act to form the bottom of the container, said discharging means being for opening said parts.

4,927,005

ACTUATOR

Lars Sirefelt, Sinjövägen 321, S-436 00 Askim, Sweden

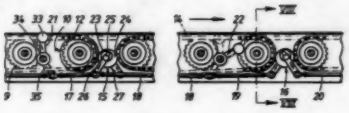
PCT No. PCT/SE88/00057, § 371 Date Oct. 19, 1988, § 102(e) Date Oct. 19, 1988, PCT Pub. No. WO88/06134, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 15, 1988, Ser. No. 264,953

Claims priority, application Sweden, Feb. 19, 1987, 8700675

Int. Cl.[5] B65G *13/06*

U.S. Cl. 198—781 **3 Claims**



1. Actuator included in a roller conveyor having a plurality of rotatable driving rollers (2–7) which are connected as sections to a driving device via a switching device (10) for each section, the sections of driving rollers being arranged to be switched by means of said switching devices between a driven state and a disengaged state depending on the presence of goods (30,31) on the respective section and the preceding section, the presence being sensed by means of a sensing member (33,36) provided for each section, said actuator (15,16) being provided at each switching device (10) for mechanically switching the switching device between at least two functional positions and comprising a rotationally symmetrical inner rotatable member (23) which is rotatably journalled by means of an eccentrically located axle (25), and, around said inner rotatable member, an eccentrically journalled outer rotatable member (24), which is provided with surfaces which by changing position, influence said switching device, the inner rotatable member (23) and the outer rotatable member (24) being arranged to assume different rotational positions, in part by rotation of the inner rotatable member about an axle (25), thereby setting the outer rotatable member in its rotational movement, and in part by rotation of the outer rotatable member (24) relative to the inner rotatable member, thus causing the said changing of position of the said actuator members, and said switching device being provided with an element (28) for switching the switching device between an engaged position and a disengaged position upon switching by means of the actuator (15,16) between a centric and an eccentric position, said sensing member (33,36) of each section being arranged, in the presence of goods on a certain section, to swing in part a first swinging arm (26) of the actuator belonging to this section and in part a second swinging arm (27) of the actuator (15,16) belonging to the following section.

4,927,006

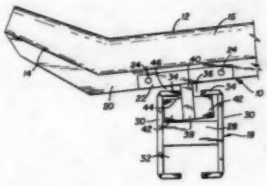
INTERNALLY STABILIZED SLIDE CONVEYOR

Michael S. Dolan, Denver, Colo., assignor to Serpentix Conveyor Corporation, Westminster, Colo.

Filed Sep. 29, 1988, Ser. No. 250,939

Int. Cl.[5] B65G *11/10*

U.S. Cl. 198—822 **17 Claims**



1. A conveyor, comprising:

a conveying surface capable of carrying a bulk load along a longitudinal path;

a track assembly including:

a generally horizontal, longitudinally extending guide surface located below the conveying surface;

a longitudinally extending side wall, extending upwardly from said guide surface; and

a longitudinally extending lip attached to said side wall at a position spaced above the guide surface and below the conveying surface, overhanging a portion of the guide surface and defining a slot between the guide surface and the lip;

an elongated pulling element comprising a chain formed of alternating vertical and horizontal links and operable over said guide surface;

a joining means associated with the pulling element for connecting the pulling element to the conveying surface; and

a laterally extending stabilizer comprising first and second blocks, each attached to an opposite lateral side of said chain, received in said slot between the guide surface and said lip, the stabilizer being of sufficient size with respect to the slot that when twisting forces are applied to the pulling element, the stabilizer is tilted into contact with an inner surface of the slot.

4,927,007

CONVEYOR SUPPORT

James H. Kramer, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

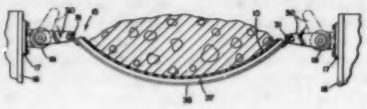
Filed Sep. 27, 1989, Ser. No. 413,145

Int. Cl.[5] B65G *15/08*

U.S. Cl. 198—823 **5 Claims**

1. A troughing conveyor support assembly for supporting a

conveyor belt for longitudinal movement thereover comprising an elongated flexible belt support, said belt support having an elongated and transversely extending flexible backing layer, said backing layer having a layer of low friction material adhered thereto for supporting the passage of said conveyor belt thereover, said backing layer having a pair of end portions, a pair of torsion springs, each torsion spring having a shell member and a shaft member, each of said torsion springs having an



elastomeric sleeve interconnecting said shell member and said shaft member for relative rotational movement of one of said members relative to the remaining one of said members, each torsion spring having one of said members connected to one of said end portions of said backing layer, a pair of rigid supports respectively connected to the other one of said members of said torsion springs to provide a catenary support to said conveyor belt under load.

4,927,008

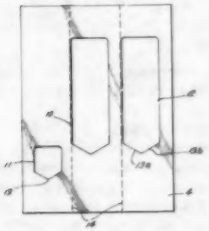
MULTI-CELLED PAPERBOARD CONTAINER WITH V-SHAPED WINDOWS

Ronald G. Platt, Chicago, Ill., assignor to Perfect Carton Corporation, Chicago, Ill.

Filed Jul. 31, 1989, Ser. No. 386,981

Int. Cl.[5] B65D *25/00*

U.S. Cl. 206—45.31 **10 Claims**



1. In a paperboard container for carrying a cylindrical article, the container having a wall structure including site, bottom, front, and back walls with the side or front or back walls comprising at least one cut-out window useful for viewing the cylindrical article conveyed by said container, the container characterized in that the bottom of the cut-out window is generally V-shaped so as to facilitate the loading of the cylindrical articles into the container.

4,927,009

ARTICLE CARRIER

James T. Stout, Ellijay, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Apr. 27, 1989, Ser. No. 343,968

Int. Cl.[5] B65D *85/40*

U.S. Cl. 206—188 **3 Claims**

1. An article carrier comprising:

a bottom wall;

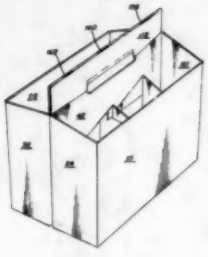
opposed side walls joined to said bottom wall along opposite side edges thereof;

end wall panels joined respectively to the end edges of said side walls and extending inwardly of the carrier;

a first pair of riser panels foldably joined respectively to said end wall panels at one end of the carrier, foldably joined to each other along a riser fold line, and extending medially inward of the carrier;

a second pair of riser panels foldably joined respectively to said end wall panels and extending medially inward of the carrier;

a pair of handle panels foldably joined respectively to said first pair of riser panels, and foldably joined to each other along a handle fold line;



said first pair of riser panels having a plurality of elongated openings defined therethrough and lying with their axis of elongation along said riser fold line to extend into each of said first pair of riser panels, and thereby to define segments of said riser fold line separated by said openings;

at least one of said elongated openings having side edges extending inwardly from each end of said one opening to lie along said riser fold line.

4,927,010

SHIPPING BAG FOR CONTAINERS OF POTENTIALLY BIOHAZARDOUS LIQUIDS

Charles P. Kannankeril, North Caldwell, N.J., assignor to Sealed Air Corporation, Saddle Brook, N.J.

Filed Dec. 27, 1988, Ser. No. 290,695

Int. Cl.[5] B65D *81/26*

U.S. Cl. 206—204 **11 Claims**

1. A shipping bag for containers of potentially biohazardous liquids characterized by the ability to absorb such liquid upon rupture of the container and to protect persons handling the bag from contact with such liquid, said bag comprising:

(a) first and second outer panels formed of liquid impervious material connected along opposed side edges and one end to define an open top liquid impervious body portion;

(b) liquid absorbing means confined within said body portion and comprising a pair of absorbent pads arranged adjacent each of said first and second outer panels;

(c) first and second inner panels formed of liquid permeable sheet material made of hydrophobic filaments, wherein

said inner panels are confined within said body portion and disposed parallel to said first and second outer panels and respectively connected therewith along said opposed side edges and opposite ends to define an open inner space in communication with said open top and separating said liquid absorbing means from said inner space; and

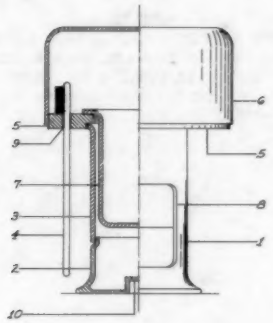
(d) closure means at said open top to sealingly close said inner space and retain any liquids within said body portion to protect persons handling the shipping bag from contact with potentially biohazardous liquid.

4,927,011

STORAGE DEVICE FOR PERSONAL DENTAL HYGIENE AND ORAL CARE PRODUCTS

William T. Wilkinson, P.O. Box 378, Chesapeake City, Md. 21915

Filed Nov. 6, 1989, Ser. No. 432,224
Int. Cl.[5] A47B 49/00; A45D 40/00
U.S. Cl. 206—217 **11 Claims**



1. A storage system for personal care items for dental hygiene and oral care comprising:

a storage tube with an interior and exterior surface and two ends, one end closed and used as the base and the other end open;

a toothbrush ring with outer and inner rims mounted on the open end of storage tube, the outer rim of the toothbrush ring extends beyond the exterior surface of the storage tube and contains a plurality of apertures in which toothbrushes hang and the inner rim extends inside the interior surface of the storage tube;

a rinse cup with an exterior flange on an open end to catch the interior rim of the toothbrush ring such that the rinse cup is stored within the storage tube and rests on the inner rim of the toothbrush ring; a rinse cup lid which rests on the rim of the toothbrush ring covering the exterior flange of the rinse cup.

4,927,012

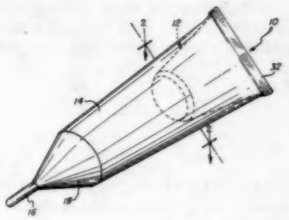
PACKAGING ASSEMBLY FOR SUBSTANCES TO BE POST-MIXED

John P. Rowe, 321 Green Hill Road, Madison, Conn. 06443

Filed Feb. 3, 1989, Ser. No. 305,620
Int. Cl.[5] B65D 25/08
U.S. Cl. 206—219 **6 Claims**

1. A packaging assembly for substances that are to be post-mixed, comprising: a tube that is integrally formed as a single piece from a synthetic resinous material, having forward and rearward ends with a continuous cavity of forwardly diminishing cross section extending therethrough and containing a first flowable substance, said tube including a closed, pliant body portion at said rearward end and a close d nozzle portion at said forward end thereof; and an ampule smaller than and contained within said tube and integrally formed as a single piece from a synthetic resinous material, said ampule having forward and rearward ends with a continuous cavity of forwardly diminishing cross section extending therethrough and containing a second flowable substance therewithin, and including a closed, pliant body portion at said rearward end and a closed frangible portion at said forward end thereof, said frangible portion being adapted to be fractured under manually applied compressive force to open said ampule, and being comprised of;

(a) a generally cylindrical sidewall element with an outer end;



(b) a blunt end wall element extending transversely across said forward end of said ampule; and

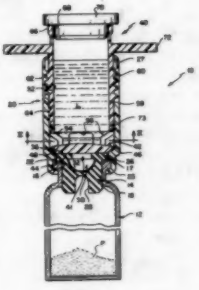
(c) a transition element extending between said outer end of said sidewall element and said end wall element, and connecting them to one another, said transition element forming a sharp internal angle having a value of about 90° or less at one of the intersections with said sidewall element and said end wall element, over which angle said material is relatively thin; whereby compressive force applied in the region of said transition element will concentrate stress at said one intersection, thereby tending to cause fracture thereat.

4,927,013

PACKAGE FOR STORING AND REMIXING TWO MATERIALS

Nicholas Van Brunt; Jeffrey C. Robertson, both of Rochester, and Daniel Homa, Spencerport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 12, 1989, Ser. No. 336,986
Int. Cl.[5] B65D 25/08, 81/32
U.S. Cl. 206—221 **7 Claims**



1. In a bottle package containing a first material in a first portion, a second material in a second portion for mixing with said first material after storage, and a barrier between said portions for maintaining the materials temporarily separate from each other, one of said portions comprising a bottle;

the improvement wherein each said portion has an outlet capable of providing material access to said other portion,

and said barrier comprises a stopper in each of said outlets, the stopper in said first portion being susceptible to leaching in the presence of the second material and the stopper in said second portion being effective to seal off the second material from access to said outlets and said stopper in said first portion,

and a plunger extending from and movably mounted in said second portion, said plunger having means for permanently attaching both of said stoppers and means for sealing at least one of said stoppers to the outlet receiving said stopper of said first portion, said plunger including means for manual engagement to allow said stoppers to be pulled away from said outlets, whereby the second material can be added to the first material after storage is no longer needed.

4,927,014

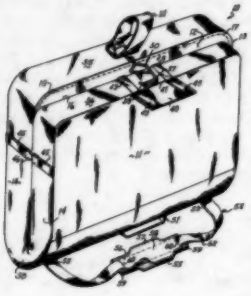
GARMENT BAG WITH FLAP COVER FOR STRAP HOOK

John V. Pulichino, Jr., Providence, R.I., assignor to American Tourister, Inc., Warren, R.I.

Filed Jun. 26, 1989, Ser. No. 371,108

Int. Cl.[5] **A95C** *5/06, 5/12, 13/10, 13/34;* **A40C** *5/12*

U.S. Cl. 206—287.1 **1 Claim**



1. A garment bag comprising:

an elongated bag having free ends,

a carrying handle and strap at the center of said bag,

said bag being foldable upon itself to bring said free ends together to form the lower end of the bag when it is carried by said handle or strap,

a hook connected by a long, flexible strap to one free end, a retaining loop on the other free end to receive said hook to hold said free ends together,

a flap hinged to said other free end adjacent said retaining loop, hook-and-loop fastener means on said flap and free end, respectively, to secure said flap against said free end overlying said hook when said hook is in said retaining loop, thereby keeping said hook from dangling when said bag is being carried by said handle or strap.

4,927,015

LUMINOUS GOLF BALLS AND CARRYING CASE THEREFOR

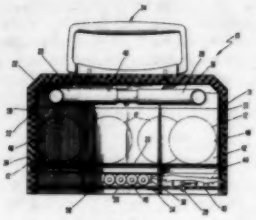
John S. Jones, 3729 N. Frontage Rd., Lakeland, Fla. 33804

Filed Jun. 21, 1989, Ser. No. 369,378

Int. Cl.[5] **B65D** *85/00*

U.S. Cl. 206—315.9 **18 Claims**

18. The carrying case of claim 17, wherein a first position of said switch means conductively couples said source of electromagnetic radiation and said battery pack and wherein a second



position of said switch means conductively couples said source of electromagnetic radiation and said solar panel means.

4,927,016

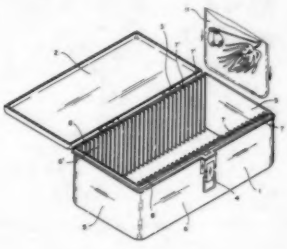
SPINNER BAIT BOX AND STORAGE SYSTEM

Jimmie G. Fuller, 113 W. Davies St., Anna, Ill. 62906

Filed Apr. 17, 1989, Ser. No. 338,886

Int. Cl.[5] **B65D** *85/00*

U.S. Cl. 206—315.11 **5 Claims**



1. A spinner bait box, comprising:

(a) an outer shell having front and rear vertical walls, end walls and an upper lid hingedly attached to said rear wall, wherein said front and rear walls have a plurality of corresponding vertical ribs therein which form individual packet spaces; and

(b) a plurality of individually removable spinner bait packets, wherein each packet comprises a stiff back portion and a pliable, expandable, clear front portion, said back and front portions being permanently attached along the sides and bottom thereof and forming a spinner bait receiving compartment, each of said packets being located within one of said packet spaces.

whereby said packets are secured in place by said ribs and said lid when closed and whereby a plurality of spinner bait lures may be stored, interchangeably categorized and conveniently viewed.

4,927,017

PROTECTIVE COVERING FOR VIDEO CAMERA OR THE LIKE

Michael D. Easter, 840 J. St., Penrose, Colo. 81240

Filed Sep. 26, 1989, Ser. No. 412,843

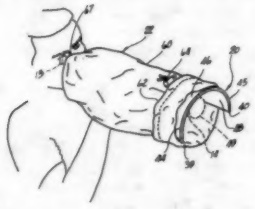
Int. Cl.[5] **B65D** *85/38*

U.S. Cl. 206—316.2 **11 Claims**

1. A cover for a video camera or the like, the camera having a main camera housing a lens tube, a microphone, a viewing tube, a hand strap with Velcro fastening devices, and a shoulder strap and comprising:

a shield means for mounting on the camera in a fixed mounting position thereon with a forward portion extending forwardly beyond the forward end of the lens tube a sufficient distance to provide a shield against moisture in the atmosphere and blocking of wind from the microphone;

fastening strap means mounted on said shield means for holding said shield means on the camera housing in the shielding position;



a flexible cloth-like bag means for providing a cavity therewithin of sufficient size and shape to receive and enclose the camera and said shield means; and

an openable and closeable audio and visual signal receiving opening means in a front end portion of said bag means and being located adjacent said forward portion of said shield means for enabling operation of the camera in an open position and for closing the bag means in a storage position.

4,927,018

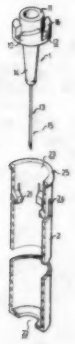
DISPOSABLE COVERED NEEDLE SAFETY ASSEMBLY

Herbert Yang; Patrick Han, and Frank Yu, all of 6-1 Fl., No. 185, Yungchi Road, Taipei, Taiwan

Filed Dec. 6, 1988, Ser. No. 280,322

Int. Cl.[5] B65D *83/10*; A61M *5/00*

U.S. Cl. 206—365 **1 Claim**



1. A disposable covered needle assembly and cover housing for use in conjunction with conventional hypodermic syringes, wherein:

said needle assembly includes: a circular mount, an orifice, a conical end and a needle, said circular mount protruding from an outer surface of the needle assembly proximate to the orifice, catch slots being vertically oriented on an upper portion of said circular mount with slanted surfaces therebetween, said slanted surfaces all slanting in a same radial direction, said orifice being inwardly tapered to frictionally engage with a discharge nozzle of said hypodermic syringe, a needle being set on an end opposite to said orifice with a needle cover thereon;

said cylindrical cover housing slidably and frictionally encompasses said hypodermic syringe, said cover housing having inward projections on an inner surface thereof proximate to said main opening, said main opening has a lip therearound to act as a grip for said cover housing, said inward projections also having a U-shaped slot therearound so as to be outwardly flexible when said hypodermic syringe is inserted into or retracted from said cover housing, said cover housing having a circular aperture at an end opposite said inward projections for allowing a lower portion of said needle assembly to pass therethrough;

said inward projections frictionally fit into said catch slots before said disposable covered needle assembly is used, a lower portion of said needle assembly being projectable from said circular aperture by pulling said lip towards a stop on an end of said hypodermic syringe, said lower portion of said needle assembly being retractable from said circular aperture by pulling said cover housing away from said stop so that said inward projections flex to be turnable on said slanted surface and to frictionally engage with said catch slots and to totally enclose said needle assembly inside of said cover housing for waste disposal after use on a patient.

4,927,019

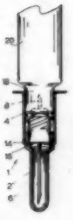
COMBINATION NEEDLE SHEATH AND STERILITY PACKAGE

Terry M. Haber, El Toro; William H. Smedley, Lake Elsinore; Clark B. Foster, Laguna Niguel, and John A. Lewis, Jr., Costa Mesa, all of Calif., assignors to Hubley Medical Technology Corporation, Laguna Hills, Calif.

Filed Jun. 12, 1989, Ser. No. 364,233

Int. Cl.[5] B65B *85/24*

U.S. Cl. 206—365 **20 Claims**

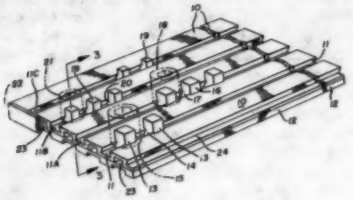


1. For a double ended needle cannula to be positioned in fluid communication with the cylinder of a hypodermic syringe and being supported by a needle hub that is adapted to be mated to said cylinder so that the cannula may communicate therewith, a combination needle sheath and sterility package comprising:

first needle cover means detachably connected to the needle hub to surround and protect the distal end of the double ended cannula; and

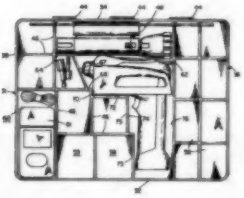
second needle cover means to surround and protect the proximal end of the cannula, said second needle cover means having an open end dimensioned to receive a portion of the syringe cylinder therethrough between the second needle cover means and the needle hub so that the needle hub can be mated to said cylinder with the proximal end of the cannula in fluid communication thereiwth, said second needle cover means being coaxially aligned with and slidable axially over said first needle cover means when the needle hub is mated to the cylinder of the syringe.

4,927,020
HOLDER FOR SOCKET WRENCH HEADS
Frank Randy, 5 N. Greenwood Ave., New Castle, Pa. 16101
Filed Mar. 13, 1989, Ser. No. 322,359
Int. Cl.[5] B65D *85/20*
U.S. Cl. 206—378 **1 Claim**



1. An improved apparatus for organizing and holding individual socket wrench heads of tools having sets of said socket wrench heads, said heads having a squared opening in one end adapted to engage a drive member and having the other end shaped to engage nuts and bolt heads, the improved apparatus comprising: a base member in the form of a flat body having upper and lower surfaces, a plurality of transversely parallel dove-tailed grooves in said upper surface thereof and a plurality of cross sectionally square posts, each having a dove-tailed downward extension adapted to fit into said dove-tailed grooves in said base member and said cross sectionally square posts fitting with frictional engagement in said squared openings in said socket wrench heads, channels formed in said lower surface of said flat body intermediate said spaced parallel dove-tailed grooves whereby the base member may be temporarily bowed transversely in a direction to increase the width of said dove-tailed grooves to permit the downturned extensions on the cross sectionally square posts to be movably placed therein.

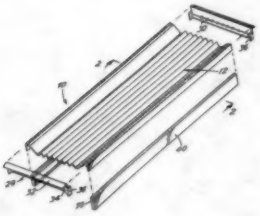
4,927,021
INSTALLER'S BRIEFCASE
Steven C. Taylor, 1413 Kesser Dr., Plano, Tex. 75023
Filed May 26, 1987, Ser. No. 53,621
Int. Cl.[5] B65D *85/28*
U.S. Cl. 206—373 **6 Claims**



1. A box for retaining tools and fasteners, comprising:
a bottom section including a rigid bottom, a rigid front wall, rigid side walls and a rigid back wall, said walls extending to a first height perpendicular to said bottom;
a lid section hingedly coupled to said bottom section, having a rigid top, a rigid front wall, rigid side walls and a back wall, said walls extending to a second height perpendicular to said top;
a plurality of rigid partitions extending from said bottom perpendicular to said bottom for a height approximately equal to said first and second height combined to form a plurality of compartments such that when said lid section is closed onto said bottom section with the respective front, side and back walls of said bottom and lid sections contacting each other, said rigid top contacts a top region of said rigid partitions to prevent articles from moving from one compartment to another even though said toolbox is inverted or laid on its side; and
said compartments including at least one compartment having a first power tool and a second power tool enclosed therein simultaneously, said at least one compartment being shaped to retain said first power tool having a first size and shape and said second power tool having a different size and shape from said first power tool's size and shape, said first power tool being retained by contacting first and second partitions which form said at least one compartment and said second power tool of a different size and shape being retained by contacting a plurality of partitions, said first and second power tools being enclosed in said box in a nested relationship, said first power tool being enclosed by contacting said rigid bottom, said first and second partitions and said second power tool being enclosed by contacting said rigid top, a plurality of partitions and said first power tool.

5. Tools and a toolbox for retaining said tools, comprising:
a bottom section including a rigid bottom, a rigid front wall, rigid side walls, and a rigid back wall, said walls extending perpendicular to said bottom;
a lid section hingedly coupled to said bottom section, having a rigid top, a rigid front wall, rigid side walls, and a back wall;
a plurality of rigid partitions extending from said rigid bottom perpendicular to said bottom to form a first compartment, said first compartment having a projecting lip formed by said partitions and defining a boundary of said compartment; and
an electric drill and a staple gun enclosed in a nested relationship within said first compartment, wherein said staple gun overlies said electric drill, said electric drill being enclosed by being restrained by said rigid bottom, and a plurality of partitions of said first compartment and said staple gun, said staple gun being enclosed by being restrained by said rigid top, said projecting lip, and a plurality of partitions and said electric drill.

4,927,022
CORE TRAYS
John D. Wilson, Sandton, South Africa, assignor to Corstor (Proprietary) Limited, Johannesburg, South Africa
Filed Mar. 14, 1989, Ser. No. 322,905
Claims priority, application South Africa, Jul. 28, 1986, 86/5995; Jul. 30, 1987, 87/5619
Int. Cl.[5] B65D *1/36*
U.S. Cl. 206—443 **28 Claims**



1. A core tray for supporting cores, comprising:
(a) a base plate of shaped sheet planar material having longitudinally extending grooves therein, the sides of which grooves are in transverse section flat and inclined to one another, the cores being supported solely by said sides,
(b) support surfaces running parallel to the grooves whereon a second similar tray can be supported, and

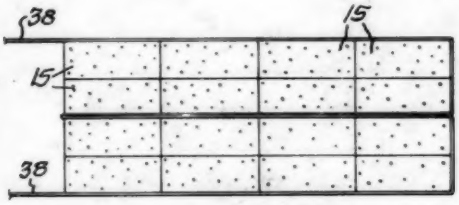
(c) re-inforcing means provided at the ends of the grooves and extending transversely to the tray.

4,927,023

SPACER MEMBER AND METHOD OF FORMING THE SAME

Paul B. Elzey, Kalamazoo, Mich., assignor to EFP Corporation, Elkhart, Ind.

Filed Mar. 24, 1986, Ser. No. 843,015
Int. Cl.[5] B65D *81/02*
U.S. Cl. 206—523 **1 Claim**



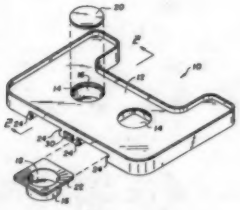
1. A foam member for use as a spacer adjacent a fragile object during storage and shipment, comprising a spacer member of selected dimensions and thickness, a tape adhered to a surface of said member by a first adhesive, a second adhesive applied to said tape at the surface thereof opposite that at which said first adhesive is applied, and a release layer adhered to said second adhesive and serving to connected adjacent spacer members, and a second spacer member of selected dimensions and thickness substantially the same as said first mentioned spacer member, said second spacer member positioned adjacent said first mentioned spacer member, a second tape spaced from said first tape and adhered to a surface of said second spacer member by said first adhesive, said second adhesive applied to said second tape at an opposite surface of said second tape, said release layer being continuous and adhered to said second tape to connect said first and second spacer members.

4,927,024

TRAY FOR A BABY'S CHAIR

Paul M. J. M. T. Lloyd, 8351 Gilbert Road, Richmond, B.C., Canada (V7C 1W4)

Filed Jan. 31, 1989, Ser. No. 305,227
Int. Cl.[5] B65D *1/34*
U.S. Cl. 206—562 **6 Claims**



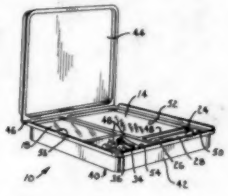
1. A tray for a chair comprising:
a main body adapted to attach to a chair;
at least one opening in the main body;
a bowl having an open top to be received in the main body with the open top aligned with the opening in the main body, the bowl being formed with a flange;
a track formed on the underside of the main body to receive the flange, whereby the bowl may be moved along the track to align with the opening in the main body; and
a lid to close the bowl and the opening.

4,927,025

CAST DECORATION KIT

Gregory E. Thompson, 1008 S. Grant, and Paul V. Thompson, 416 E. Mitchell, both of, Marshall, Mo. 65340

Filed Sep. 11, 1989, Ser. No. 405,229
Int. Cl.[5] B65D *69/00*
U.S. Cl. 206—575 **17 Claims**



1. A kit for use with a cast said kit comprising:
a marking instrument adapted to mark on the cast;
an instrument holder for releaseably receiving said marking instrument and having means for attaching said holder detachably to the cast;
a decorative fabric sleeve having a size and shape to closely cover the cast to enhance the appearance thereof;
a plurality of decorative articles applicable to the cast to decorate same; and
a package in which said decorative articles, said fabric sleeve, said instrument holder and said marking instrument are all contained.

4,927,026

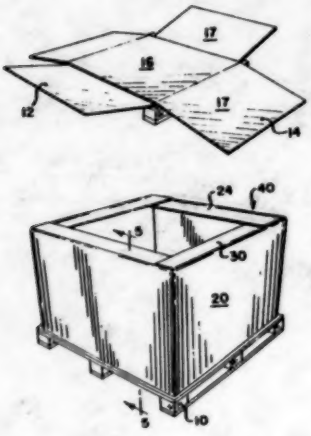
PALLET BOX

Hans K. Gossler, Munster, Ind., and Charles P. Roberts, Springfield, Ohio, assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Aug. 2, 1985, Ser. No. 761,999
Int. Cl.[5] B65D *19/00*
U.S. Cl. 206—600 **13 Claims**

12. A container assembly comprising:
a rigid pallet base;
a first cardboard floor board covering said pallet base and being fixably connected to said pallet, said floor board having foldable end flaps;
a second cardboard floor board covering said first floor board and being nailed to said pallet, said second floor board extending in a direction generally transverse to said first floor board, said second floor board having foldable end flaps; and
a tubular member with a rectangular cross sectional area

surrounding said floor board end flaps folded in a vertical orientation, and said tubular member having flaps foldable



in an alternating overlapping manner to form a fixed top frame border for said container.

4,927,027

RECLOSABLE CARTON

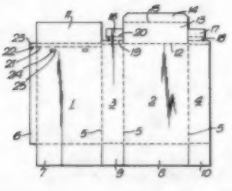
Willem Beute, Zwijndrecht, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed Jun. 3, 1988, Ser. No. 202,174

Claims priority, application United Kingdom, Jun. 5, 1987, 8713265

Int. Cl.[5] B65D *5/54*

U.S. Cl. 206—611 **9 Claims**



1. A reclosable carton comprising a front wall, a back wall, and two opposite side walls, minor closure flaps foldably attached to the side walls, an inner major closure flap foldably attached to the front wall overlying the minor closure flaps and an outer major closure flap foldably attached to the back wall overlying and adhered to the inner major closure flap to form therewith a reclosable lid to the carton, a tuck-flap attached to the outer major closure flap along an edge opposite the connection to the back wall and folded to overlie the front wall, and tear means extending across the front wall adjacent to the connection between the front wall and the inner major closure flap, the tuck flap being insertable within the carton along the tear means to lie behind the front wall and retain the lid in the reclosed position.

4,927,028

PACKAGE HAVING A TEAR-OPEN STRIP

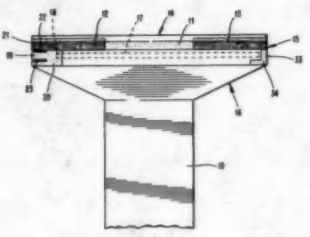
Gerhard Hemm, Sottrum; Gerhard Claussing, and Heiko Pietzsch, both of Berlin, all of Fed. Rep. of Germany, assignors to Jacobs Suchard AB, Zurich, Switzerland

Filed Jun. 17, 1988, Ser. No. 208,051

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1987, 3721890; Nov. 2, 1987, 3737111; Mar. 8, 1988, 3807469

Int. Cl.[5] B65D *27/38*

U.S. Cl. 206—618 **15 Claims**



1. A vacuum pack comprising:

a body of multilayer composite sheet material having a pourable product located therein in the form of a block, said body surrounding the block and extending from both ends thereof, one end of said body extending from said block being provided with a closure seam which extends across said body so that the portion of said body which extends from said block forms a fin fold;

a tear-open strip on said body located between said block and said closure seam;

a side weld located along a portion of a side edge of said fin fold, said side weld securing together wall portions of said composite sheet material; and

a punch cut located in said side weld, said punch cut defining a grip tab which can be grasped and pulled so as to initiate tearing of the pack, said tear-open strip extending across at least a portion of said fin fold and having one end located proximate to said punch cut and another end located distally from said punch cut, the end of said tear-open strip located proximate to said punch cut defining a gripping end of the tear-open strip, said gripping end being spaced from said punch cut so as to ensure that the side weld is tightly sealed and said gripping end of said tear-open strip being positioned in said side weld.

4,927,029

DEVICE FOR CHECKING CYLINDRICAL BODIES, ESPECIALLY TUBES OF OPEN-END SPINNING MACHINES

Jiří Thrlik, Ústí nad Orlicí, Czechoslovakia, assignor to Elitex koncern textilního strojírenství, Liberec, Czechoslovakia

Filed Aug. 30, 1988, Ser. No. 239,163

Claims priority, application Czechoslovakia, Aug. 31, 1987, 6330-87

Int. Cl.[5] B07C *5/00, 5/34*

U.S. Cl. 209—538 **1 Claim**

1. An apparatus for inspecting cylindrical tubes transported along a feed path from a tube supply container by means of a vertical chain conveyor having a plurality of uniformly spaced feed blades and driven by an intermittent cyclical drive means which advances each cylindrical tube in a stepwise manner through an operative cycle, the apparatus comprising

said intermittent cyclical drive means comprising a maltese cross wheel whereby during one cycle in which said wheel is driven one complete revolution, said conveyor is stopped for ¾ of said cycle and moves for ¼ of said cycle;

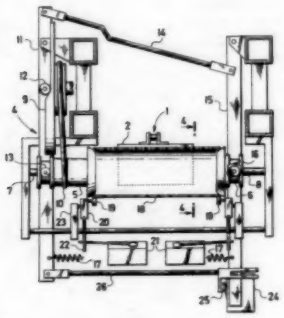
an auxiliary container for receiving discarded tubes mounted above the tube supply container proximate to said cyclical

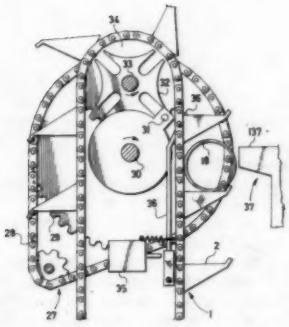
drive means and adjacent to said feed path, said auxiliary container having an inlet aperture facing the feed path;

centering means mounted proximate said cyclical drive means and transversely to the feed path and arranged such that when said conveyor is stopped, said centering means is coaxial with respect to a tube on said conveyor;

driving means operatively connected to said centering means for imparting rotary motion to said tube;

an inspection means comprising contact means, feeler means, and switch means ; said centering means operable to center said tubes relative to said inspection means, said





contact means contacting only opposite edges of a centered tube and operatively connected to said feeler means which is operatively connected to said switch means, whereby said opposite edges of said tube are inspected by said inspection means while said conveyor is stopped and said switch is activated if one of said edges is imperfect;

removing means mounted along said feed path opposite said inlet aperture, said removing means being operatively connected to said switch such that said removing means shifts said tube out of the feed path and into the inlet aperture of the auxiliary container in response to said switch being activated.

4,927,030

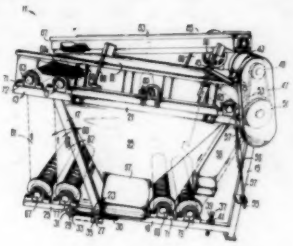
METHOD AND APPARATUS FOR DEBRIS SCREENING AND SORTING OF PEANUTS

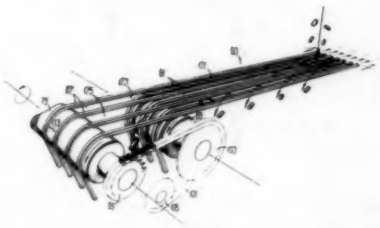
Jack T. Chastain, and John McWhorter, both of Rochelle, Ga., assignors to Doster Warehouse, Rochelle, Ga.

Filed Nov. 7, 1988, Ser. No. 268,156

Int. Cl.[5] B07B *1/10*

U.S. Cl. 209—620 **8 Claims**





1. A peanut debris cleaning and sorting apparatus comprising:

at least two sets of sorting belts defining a substantially horizontal surface, each set longitudinally offset relative to the adjacent set, the sets interposed to position a belt from one set adjacent a belt from another set, each set comprising a plurality of endless belts spaced apart to define a gap between adjacent belts;

at least two upper deive shafts for each set of belts;

at least one lower drive shaft for each set of belts;

a motor connected to one drive shaft of one set of sorting belts;

sprocket means connected between the motor driven shaft of the one set of sorting belts and a drive shaft of each other set of sorting belts to drive each set of sorting belts at different speeds; and

means for changing the vertical position of one upper drive shaft of one set of belts relative to the upper drive shafts of the other set of belts, whereby the gap between adjacent belts is changed.

4,927,031

DOCUMENT SORTER FOR READER/PRINTER EQUIPMENT

Emilio B. Martin, Madrid, Spain, assignor to AMPER, S.A., Madrid, Spain

Filed May 10, 1989, Ser. No. 350,097

Claims priority, application Spain, May 10, 1988, 8801449

Int. Cl.[5] B07C *5/36*; B65H *29/70*

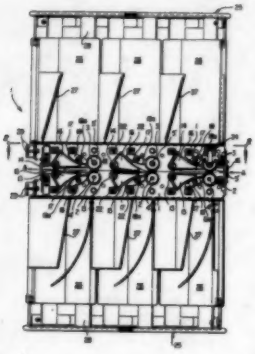
U.S. Cl. 209—657 **18 Claims**

1. A document sorter for sorting different types of documents processed by a document reader/printer according to type of document comprising:

a support structure;

at least one drive wheel pair for pulling said documents through said document sorter, each said drive wheel pair comprised of a drive wheel and a guide wheel in tangential contact with each other and mounted on said support structure;

at least one document guide, each said document guide comprised of first and second concave guide parts rotatably mounted on said support structure and first and second convex guide parts, said first and second concave guide parts each having an inner side and a concavely curved outer side, said inner sides facing each other to define a document passage therebetween through which



undeflected documents travel, said first and second convex guide parts each having a convexly curved side respectively facing said first and second concavely curved outer sides, said first concavely curved outer side and said first convexly curved inner side defining a first deflected document path, said second concavely curved outer side and said second convexly curved inner side defining a second deflected document path;

a pair of compartmentalized sorter bins mounted on said support structure, each said compartment of said sorter bins receiving a different type of document; and

means for selectively deflecting said documents along said first or said second deflected document path.

4,927,032

GLASS RACK

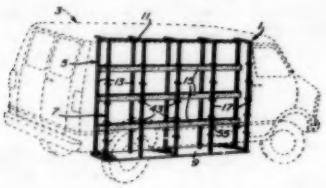
Roger Mercure, 399 Principale, Ste. Dorothée, Laval, Quebec, Canada (H7W 3S6)

Filed Mar. 17, 1989, Ser. No. 324,764

Claims priority, application Canada, Sep. 2, 1988, 576500

Int. Cl.[5] A47F *7/00*

U.S. Cl. 211—41 **7 Claims**



1. A rack for snugly holding sheets:

the rack having two opposed sides for receiving sheets therebetween;

a plurality of clamps on one of the two sides of the rack for clamping the sheets snugly against the other of the two sides;

each clamp comprising:

a clamping bar with opposed ends, one of the ends being cushioned;

fixed pivot means pivotally connecting the clamping bar at a location spaced from its cushioned end, to the one side of the rack; the clamping bar movable about the pivot means between a generally upright, inoperative position, and an upwardly sloping operative position where its cushioned end abuts sheets resting against the other side of the rack; and holding means on the one side of the rack, separate from and movable relative to the pivot means; the holding means holding the clamping bar in its operative position to have its cushioned end clamp the glass sheets against the other side of the rack.

4,927,033

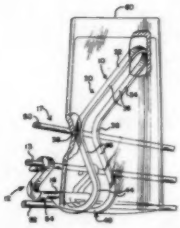
REMOVABLE ARTICLE HOLDER FOR A DISHWASHER

Ginger E. Patera, Lincoln Township, Berrien County; Larry L. Janke, and William T. Lampman, both of Joseph Township, Berrien County, all of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 30, 1988, Ser. No. 292,262

Int. Cl.[5] A47F *7/00*

U.S. Cl. 211—41 **33 Claims**



1. An article holder for securing an article in a basket having at least one horizontally extending tine and at least one member extending above said tine comprising:

means for interconnecting said article holder with said basket tine;

means extending generally vertically with respect to said interconnecting means for engaging an article; and

means interposed between said interconnecting means and said article engaging means for resiliently biasing said article engaging means towards said basket member to resiliently hold a portion of said article between said article engaging means and s id basket member.

4,927,034

STEERABLE POWER DRIVE FOR GANTRY CRANE

John A. Holden, 107 Shedoke Ave., Hamilton, Ontario, Canada (L8P 4P2)

Filed Jul. 18, 1988, Ser. No. 220,330

Int. Cl.[5] B66C *5/02*

U.S. Cl. 212—218 **2 Claims**

1. A self-propelled steerable gantry comprising:

a. an elevated load carry beam;

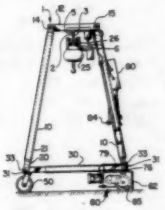
b. individually adjustable downwardly divergent pairs of legs spaced apart lengthwise of said beam proximal the ends thereof for supporting said beam;

c. tie means between the lower ends of the legs of each said pair of legs to maintain and adjust the angularity between said legs; said tie means having a length which is substantially shorter than the length of said beam; and

d. ground engaging mobile mountings for said gantry including:

i. a castering wheel disposed adjacent the lower end of one leg of each said pair of downwardly divergent legs, each said castering wheel being capable of swivelling about an upright axis perpendicular to the longitudinal axis of said tie means;

ii. a fixed orientation wheel disposed adjacent the lower end of the other leg of each said pair of legs and being aligned with the longitudinal axis of said tie means, the distance between the two fixed orientation wheels and



the distance between the two castering wheels being substantially greater than the distance between the caster wheel and the fixed orientation wheel of each said pair of downwardly divergent legs in all adjustement positions of said legs;

iii. a prime power mover operatively connected to each of said fixed orientation wheels and capable of independently rotating each said fixed orientation wheel in a forward or reverse direction; and

iv. control means operable to independently actuate said prime mover means for forward or reverse rotation of said fixed orientation wheels.

4,927,035

AUTOMATIC COUPLING FOR RAIL BORNE VEHICLES

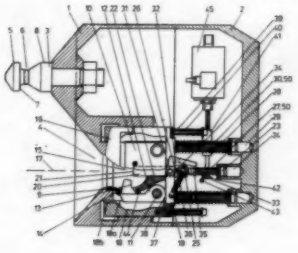
Markus Geng, Stühlingen, Fed. Rep. of Germany, and Dominique Loutan, Geneva, Switzerland, assignors to Georg Fischer AG

Filed May 17, 1989, Ser. No. 353,347

Claims priority, application Switzerland, May 17, 1988, 01879/88

Int. Cl.[5] B61G *3/00*

U.S. Cl. 213—77 **16 Claims**



1. Automatic coupling for a rail vehicle having two similar coupling heads, each said coupling head comprising:

(a) a tension bolt;

(b) a tension bolt receptacle;

(c) a locking mechanism in the receptacle;

(d) a unlocking device connected to the locking mechanism;

(e) means connected to the locking mechanism and operable during the coupling process for storing energy;

(f) means operable upon actuation of said unlocking device to release the energy stored in said energy storing means for actuating said locking mechanism so that it will allow decoupling.

4,927,036

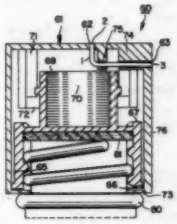
CONTAINER WITH TAMPER INDICATOR USING PIPED LIGHT

Edward P. Diehl Pojedinec, 112 S. Valley Rd., Lincoln Park, N.J. 07035

Continuation of Ser. No. 9,720, Feb. 2, 1987, abandoned. This application Feb. 17, 1989, Ser. No. 312,433

Int. Cl.[5] B65D *55/02*

U.S. Cl. 215—203 **13 Claims**



1. A packaging system for packaging a product and indicating whether the packaging system has been opened so as to provide evidence of tampering, said system comprising, in combination:

a container;

a cap, including a top and a skirt, for closing the container;

light guide means for providing said evidence of tampering and including a light collecting surface for collecting ambient light, a light emitting surface for emitting at least a portion of the light transmitted through the guide means, and an intermediate section between said light collecting and emitting surfaces and constructed so as to be in a first condition when said cap is initially secured to said container and in a second condition when said cap is initially removed from said container, and wherein said light guide means is secured within said cap so that the light collecting surface collects light at the top of said cap, and the light emitting surface emits light from the skirt of said cap when said intermediate section is in at least one of said conditions; and

means for permanently modifying said intermediate section so as to change the condition of said intermiate section from said first condition to said second condition when said cap is initially removed from said container so as to alter the light emitted from said light emitting surface.

4,927,037

CONTAINER FOR FLUIDS, SOLIDS HAVING FLOW PROPERTIES OF THE LIKE

Gerardus A. M. Boots, Boskriek 72, 5401 LP Uden, Netherlands

Filed Sep. 27, 1988, Ser. No. 249,869

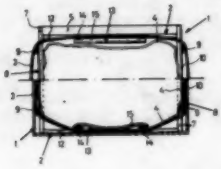
Claims priority, application Netherlands, Sep. 30, 1987, 8702331

Int. Cl.[5] B65D *90/16, 90/20*

U.S. Cl. 220—1.5 **9 Claims**

1. A container for fluids, solids having for properties, or the like comprising a box of a conventional packing material, a supporting frame inside the box and of a material that is at least in part stronger and of greater dimensional stability than said conentional packing material, and an inner bag inside the frame and of a conventional flexible packing material for containing the material being packed, said supporting frame including four opposed frame sidewalls each having a pressure face

extending the full height of the respective side wall but having a width less than that of the respective sidewall, and said container further comprising a sleeve of a relatively thin material of high tensile strength and relatively low stretch extend-



ing on the outside of, and around the pressure faces, and from one side of a pressure face substantially directly to the adjacent side edge of the pressure face of the adjacent sidewall, the circumference of said sleeve being less than the outer circumference of the supporting frame.

4,927,038

CONTAINER FOR HIGH PRESSURE GASES

Maurice J. Roebuck, Dorking, Surrey, England, assignor to British Petroleum Company p.l.c., London, England

Filed Jul. 14, 1989, Ser. No. 380,056

Claims priority, application United Kingdom, Aug. 5, 1988, 8818622

Int. Cl.[5] B65D *90/04*

U.S. Cl. 220—3 **20 Claims**

1. A container for high pressure gases, which comprises a hollow shell of thermoplastic mataerial having an inner surface and an outer surface, at least one of which is covered with a layer comprising a metallised film of plastics material; and an outer layer comprising fibrous windings bound together with resin.

11. A method for fabricating a container for high pressure gases, the method comprising preparing a hollow shell of thermoplastic material having an inner and an outer surface; covering at least one of said surfaces with a layer comprising a metallised film of plastics material; wrapping the resulting shell with fibrous windings, said windings being impregnated with resin before or after wrapping; and curing the resin.

4,927,039

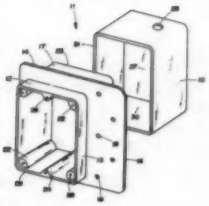
ELECTRICAL BOX

Wayne McNab, Ladner, Canada, assignor to Viscount Industries Limited, Vancouver, Canada

Filed Jul. 12, 1989, Ser. No. 378,920

Int. Cl.[5] H02G *3/12*

U.S. Cl. 220—3.7 **13 Claims**



1. An electrical box for use in building electrical wiring systems, telephone wiring systems, cable television or other similar systems, comprising:

(a) a receptacle having an open front face;

(b) admitting means for permitting passage into an interior of said receptacle of a wire or cable;

(c) a receptacle attachment removably affixable to the front face of said receptacle;

(d) a flange affixed to an exterior surface of said receptacle attachment encircling the latter and spaced apart from open first and second opposite faces thereof a pre-selected distance equal to first and second pre-selected wall covering thicknesses;

(e) means for affixing said attachment to said receptacle with either the first or second face juxtaposed to said receptacle; and

(f) means for attaching said flange to a wall frame.

4,927,040

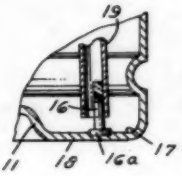
PLASTIC DRUM AND METHOD OF MAKING

Harley L. Cramer, Swanton, Ohio, assignor to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Filed Aug. 7, 1989, Ser. No. 390,004

Int. Cl.[5] B65D *21/00*

U.S. Cl. 220—5 R **4 Claims**



1. A plastic drum comprising

a side wall,

a bottom wall and

a top wall having an opening therein and

a plastic stem fusion bonded to the inner surface of the bottom wall in general alignment with the opening such that a dispensing tube can be inserted through the opening with the lower end of the tube engaging the stem to hold the dispensing tube in position adjacent the bottom wall.

4,927,041

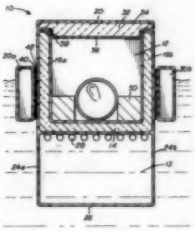
SELF-STABILIZING FLOATING COOLER

Michael J. Hepburn, 5806 Old Lodge Dr., Houston, Tex. 77066

Filed Jul. 15, 1988, Ser. No. 220,072

Int. Cl.[5] B65D *1/24*; A01K *97/00*

U.S. Cl. 220—20 **27 Claims**



1. A self-stabilizing floating cooler, comprising:

a floor and contiguous wall extending vertically therefrom made of an insulated material to define a storage cavity;

a chamber for containing water formed beneath said floor, said chamber having perforations substantially adjacent said floor for allowing the passage of water and air therethrough, wherein the chamber fills with water when the cooler is placed therein to stabilize floatation thereof wherein said chamber has a depth at least one third that of

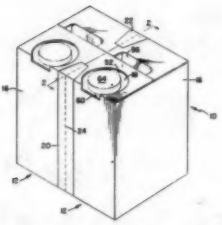
said storage cavity and wherein the chamber is drainable of water when the cooler is removed therefrom; and floatation means mounted on said wall.

4,927,042

DISPENSING BOTTLE CONTAINER ASSEMBLY INCLUDING SEPARABLE COMPOSITE PACKAGES

Robert G. Ring, Memphis, Tenn., assignor to Ring Can Corporation, Oakland, Tenn.

Filed Mar. 30, 1989, Ser. No. 330,487
Int. Cl.[5] B65D *21/02*; B67D *5/00*
U.S. Cl. 220—23.83 **2 Claims**



1. A container assembly comprising at least two packages arranged side by side, each package including an outer rectangular carton and a bottle mounted within said carton, said bottle having a pouring spout at one end thereof, said carton including front, rear, and first and second side walls, a flap assembly at one end of said carton including first and second side flaps connected to said side walls and folded substantially perpendicular to said side walls, said first and second side flaps having their edges shaped so as to cooperate to form a first opening for said spout and a second opening defining a handle, front and rear flaps connected to said front and rear walls and folded over said side flaps, said front and rear flaps having edges which lie adjacent to each other, said front flap having a third opening aligning with said first opening to accommodate said spout, said rear flap having means cooperating with said second opening to form said handle, said front wall having a recess intersecting and extending downwardly from said third opening, said carton having a bottom flap assembly at its other end and including bottom front and rear flaps folded perpendicularly from said front and rear walls and having edges spaced from each other to define a bottom opening, and bottom side flaps connected to said side walls and folded over said bottom front and rear flaps, said bottom side flaps including means defining a handle overlying said bottom opening, and means separably connecting together the outer cartons of said packages, whereby said packages are shipped together as an assembly and then separated for use individually without having to remove the bottle from its carton.

4,927,043

NECKED-DOWN CAN HAVING A FALSE SEAM AND AN APPARATUS TO FORM SAME

Dirk Vanderlaan, Alameda, Calif., assignor to Ihly Industries, Inc., Englewood, Colo.

Filed Nov. 13, 1987, Ser. No. 120,338
Int. Cl.[5] B65D *8/20*
U.S. Cl. 220—67 **4 Claims**

1. A three-piece can which comprises:

(a) a thin wall, hollow cylindrical can body including open top and bottom ends, and;

(b) a pair of generally flat, circular cover elements;

(c) each of said cover elements being secured to one of the open ends of said cylindrical can body at a circumferential seam; each of said circumferential seams having an external diameter that is larger than the diameter of the cylindrical can body adjacent thereto;

(d) one of said cover elements having a diameter which is less than the diameter of said cylindrical can body;

(e) said cylindrical can body being formed to a tapered portion adjacent a reduced end portion upon which said one of said cover elements is secured;

(f) said cylindrical can body including a circumferential bulge portion immediately adjacent said tapered portion;

(g) said circumferential bulge portion having an external diameter which is equal to the external diameter of the circumferential seam securing the other of said cover elements to said cylindrical can body.

3. A three-piece can comprising first and second end pieces and a substantially cylindrical body therebetween, said first end piece being adjoined to a first end of said body to define a first adjoinment and said second end piece being adjoined to a second end of said body to define a second adjoinment, said body being integrally formed between said first adjoinment and said second adjoinment, said second adjoinment having a

diameter less than said first adjoinment, said body having a circumferential bulge located near said second adjoinment, and said bulge having a diameter equal to the diameter of said first adjoinment and greater than the average diameter of the cylindrical body therebetween, wherein said can may roll substantially straight when horizontally oriented.

4. A three-piece can comprising first and second end pieces and a substantially cylindrical body therebetween, said first end piece being adjoined to a first end of said body to define a first adjoinment and said second end piece being adjoined to a second end of said body to define a second adjoinment, said body having a necked-in portion near said second adjoinment and having an outwardly tapered portion adjacent thereto, said second adjoinment having a diameter less than the diameter of said first adjoinment, said body having a circumferential bulge immediately adjacent to said tapered portion, said bulge having a diameter equal to the diameter of said first adjoinment and greater than the average diameter of the cylindrical body therebetween, wherein said can may roll substantially straight when horizontally oriented.

4,927,044

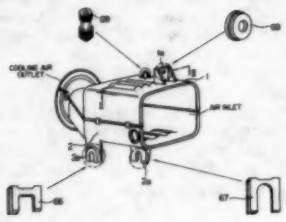
HEAT INSULATING CASE AND PROCESS FOR PREPARING THE SAME

Masao Gotoh, Yokosuka; Yasuo Hira; Kenichi Waragai, both of Fujisawa; Shozo Nakamura, Yokohama, and Hitoshi Yokono, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 442,464, Nov. 17, 1982. This application Feb. 28, 1985, Ser. No. 706,248
Claims priority, application Japan, Nov. 20, 1981, 56-185366; Nov. 20, 1981, 56-185373
Int. Cl.[5] B65D *25/00*
U.S. Cl. 220—83 **16 Claims**

1. A heat-insulating structure for an automobile air conditioner, which heat-insulating structure comprises a body part with projected parts on its outer surface, the body part being a body part consisting of an upper case part and a lower case part of foamed polyurethane resin, the upper and lower case parts being case parts formed by mixing and foaming a liquid A and a liquid B, the liquid A comprising 100 parts of a mixture of polyols consisting of 20 to 60% by weight of an aliphatic amino-based polyol, 30–60% by weight of an alkylene oxide adduct of 4,4'-diaminodiphenylmethane and 10 to 40% by weight of a polyol obtained by adding an alkylene oxide to compounds having two or three active hydrogens, total

thereof being kept to 100% by weight, 1 to 5 parts by weight of a foam-controlling agent, 5 to 45 parts by weight of water or an organic liquid compound of low boiling point as a foaming agent and 0.2 to 10 parts by weight of a catalyst, and the liquid B comprising 110 to 190 parts by weight of polyisocyanate on the basis of 100 parts by weight of the mixture of the polyols, the heat-insulating structure having an overall density of 300–700 kg/m^3; the body part having a density of 50 to 700



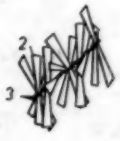
kg/m^3, and having skin layers of a high density sandwiching a core of lower density containing independent foam cells, the core being a core integrally molded with the skin layers; and the projected parts being of higher density than that of the body part, the projected parts having a density of 800–1200 kg/m^3, the projected parts having U-type metal inserts, metal washer inserts or screw metal inserts therein, the projected parts being integrally molded together with the body part.

4,927,045

SYSTEM OF SAFETY TANK ELEMENTS PREVENTING EXPLOSIONS

Helmut J. Lichka, Vienna, Austria, assignor to Technolizenz Establishment, Triesen, Liechtenstein

Continuation of Ser. No. 713,727, Feb. 27, 1985, abandoned. This application Dec. 21, 1988, Ser. No. 289,481
Claims priority, application Austria, Jun. 27, 1983, 2342/83
Int. Cl.^{5} B65D *25/00*
U.S. Cl. 220—88 R **21 Claims**



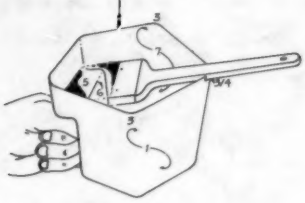
1. A filler apparatus for a container which can hold an explosible fluid and which has at least one opening, comprising filler means capable of passing through the largest opening in the container for forming therein a three-dimensional structure which is at least one of thermally and electrically conductive, said filler means including a filling element having a dimension in at least one direction which, when in the interior of the container, exceeds the greatest dimension of the largest opening in the container, said filling element including a plurality of diverging elements which are elastically deformable and project from at least one support member, said diverging elements having ends remote from said support member which are free of interconnections.

4,927,046

HOLDING VESSEL WITH SUPPORTIVE HANDLE

Robert E. Armstrong, 118 Chestnut Ave., Medford, Oreg. 97501

Continuation-in-part of Ser. No. 645, Jan. 5, 1987, abandoned. This application May 16, 1988, Ser. No. 194,189
Int. Cl.^{5} A47G *19/22*
U.S. Cl. 220—90 **1 Claim**



1. A holding vessel, having a base, a body having a pentagonal cross-sectional shape in a plane parallel to said base, a supportive handle, and an upper rim comprising:

said vessel having a ledge, located between the base and the upper rim, formed by an inset in the sidewall below the ledge, said sidewall extending from the base to an inner edge of the ledge and from an outer edge of the ledge to the upper rim;

said upper rim being of pentagonal shape, the corners of said upper rim being rounded and flexible in order to form left, right, and front-end pouring spouts;

said front-end pouring spout being located opposite said ledge and having a notch to keep the handle of a paint brush from sliding back and forth, and in conjunction with the opposing ledge, forming a built-in paint brush holder;

said supportive handle, located in the middle of one of the five sides of the body of the vessel and on the same side as the ledge, beginning at the base of the vessel, extending outwardly parallel to said base, then upwardly, generally parallel to said sidewall and intersecting said ledge, said handle being an integral part of the body of the vessel;

said handle angling away from the body of the vessel in a pistol-grip fashion;

the body of the vessel above the ledge and handle and extending to the rim being thicker and more rigid than the rest of the body;

said base having three low, narrow ridges extending inwardly therefrom.

4,927,047

INSULATED JACKET FOR BEVERAGE CONTAINER

Michael G. Stuber, Shakopee, and Charles E. Effertz, Wayzata, both of Minn., assignors to Custainer Corporation, Eden Prairie, Minn.

Filed Jul. 31, 1989, Ser. No. 388,066
Int. Cl.^{5} A47G *19/00*
U.S. Cl. 220—90.2 **21 Claims**

1. A reusable insulated jacket constructed and arranged for removably receiving an open cylindrical beverage container therewithin and for preventing windblown sand and other foreign materials from entering the opening of the container, said jacket comprising:

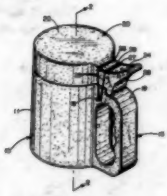
(a) an upright main body member of molded thermal-insulating material having a substantially cylindrical open interior and a closed bottom and a cylindrical opening at its upper end which will receive an open cylindrical beverage container therein in close-fitting shape-conforming thermal-insulating relation;

(b) said body member having an exterior bearing surface;

(c) a separate imperforate molded cover member of thermal-insulating material extending across said upper end of said

main body member and sealing off said cylindrical opening, said cover member having an underside;

(d) said cover member having a cooperative bearing surface at said underside engaging said bearing surface of said body and pivoting thereagainst while moving between open and closed positions of said cover member relative to the interior



of said main body member, thereby providing a pivot function for said cover member during such movement; and

(e) resilient tension means extending between said cover member and said body member and maintaining said bearing surfaces in interengaging relation and urging said cover member toward said closed position.

4,927,048

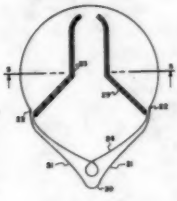
BEVERAGE CAN HAVING A SANITARY COVER

Roy T. Howard, 2750 Plumas St, #300, Reno, Nev. 89509

Filed Apr. 14, 1986, Ser. No. 851,544

Int. Cl.[5] B65D *51/20*

U.S. Cl. 220—90.2 **2 Claims**



1. A protective covering for a beverage can having a top closure panel having a pouring aperture sealed by a pull-tab and a raised perimeter rim, said covering comprising an integral aluminum foil of substantially circular periphery having a tear-resistant plastic coating and configured to cover said closure panel and rim in adhesive attachment therewith, and a tear-away access strip constituting a portion of said foil in aligned disposition above said pouring aperture, said access strip being defined by pathways wherein said tear-resistant plastic coating is not functionally present, said pathways terminating in extremities within said tear-resistant plastic coating, thereby permitting easy and controlled tearing of the foil at the boundaries of the access strip, yet preventing complete separation of the access strip from the remainder of the foil.

4,927,049

LOCKING RADIATOR CAP

John Giordano, 123 Hempstead, Lynbrook, N.Y. 11563

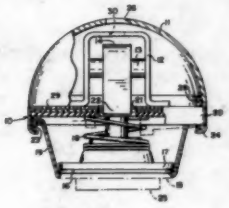
Filed Aug. 15, 1989, Ser. No. 393,997

Int. Cl.[5] B65D *55/00*

U.S. Cl. 220—201 **6 Claims**

1. A thermally locking radiator cap for coupling to the filler neck flange of a conventional radiator wherein the filler neck flange is formed with diametrically opposite, radially-open opening notches for receiving the inwardly bent radial fingers of a radiator cap comprising;

thermally responsive stop means disposed on a surface of the radiator cap and in thermal communication with the cap, said stop means having one end secured to said cap and its opposite end disposed along the peripheral edge of the cap;



an opening formed along the outer periphery of said radiator cap for receiving said thermally responsive stop means so that when radiator heats up, said stop means will expand and pass through the opening formed in the periphery of the radiator cap and pass into a corresponding opening notch of the filler neck flange thereby preventing any rotational movement of the cap with respect to the filler neck;

4,927,050

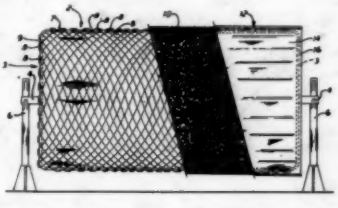
METHOD OF MAKING DOUBLE WALL STORAGE TANK FOR LIQUIDS FROM A METAL TANK HAVING A PATTERNED SURFACE

David T. Palazzo, P.O. Box 290676, Tampa, Fla. 33687

Continuation-in-part of Ser. No. 194,387, May 16, 1988, Pat. No. 4,817,817, which is a continuation-in-part of Ser. No. 105,890, Oct. 7, 1987, Pat. No. 4,780,997, which is a continuation-in-part of Ser. No. 105,881, Oct. 7, 1987, Pat. No. 4,780,946, and a continuation-in-part of Ser. No. 43,634, Jun. 11, 1987, Pat. No. 4,744,137, which is a division of Ser. No. 884,481, Sep. 11, 1986, abandoned, which is a continuation-in-part of Ser. No. 884,389, Apr. 7, 1987, Pat. No. 4,655,367, which is a continuation-in-part of Ser. No. 818,258, Jan. 13, 1986, Pat. No. 4,644,627, which is a continuation-in-part of Ser. No. 775,140, Sep. 12, 1985, Pat. No. 4,640,439. This application Apr. 3, 1989, Ser. No. 332,806

Int. Cl.[5] B23D *9/00*

U.S. Cl. 220—445 **12 Claims**



1. A method of manufacturing a double wall storage tank for storage of liquids, comprising the steps of

forming a substantially rigid inner tank from metal with at least lower portions of said inner tank being formed from patterned metal having a pattern of projections formed of said metal and extending outwardly from a base surface on at least one side thereof, such that the exterior surfaces of said portions of said inner tank include said projections extending outwardly therefrom;

stretching over said inner tank and said projections a sheet of imperforate material to separate said inner tank from subsequently applied sheathing material; and

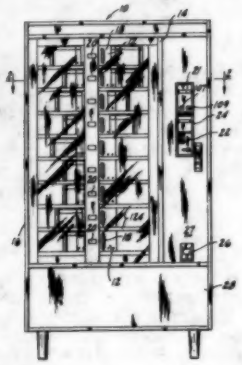
applying over said inner tank exterior and said sheet a substantially rigid outer sheath of a material that is substantially liquidtight, said sheath being spaced from said inner tank exterior surface by said sheet supported on said projections, whereby is provided a rigid, double wall tank.

4,927,051

MULTIPLE-PRODUCT MERCHANDISING MACHINE

Leonard P. Falk, Florissant, and Paul K. Griner, St. Louis County, both of Mo., assignors to UniDynamics Corporation, New York, N.Y.

Filed Oct. 26, 1987, Ser. No. 112,475
Int. Cl.[3] G07F 11/54
U.S. Cl. 221—12 19 Claims



1. A multiple-product merchandising machine comprising:

a cabinet having a viewing area in which the products in several of the compartments on each shelf can be seen at one time by a potential customer;

a cylindrical merchandise carrying drum mounted within the cabinet for rotation about its central longitudinal axis and having a plurality of annular product supporting shelves at spaced intervals along the drum concentric with the axis of the drum, a plurality of walls extending between adjacent shelves and together with the shelves defining a plurality of individual compartments in which product may be placed;

a plurality of access doors in the cabinet, one each associated with a respective shelf on the merchandise carrying drum and disposed adjacent thereto for allowing access to a compartment on the respective shelf when the compartment is aligned with it, the access doors being movable between an open position and a closed position and being normally locked in the closed position;

currency actuated means for allowing a selected access door to be moved from the closed position to the open position when a predetermined amount of currency is inserted by a customer;

reversible motor means for rotating the merchandise carrying drum in either direction;

manually controllable actuating means for actuating the reversible motor means to rotate the merchandising drum to allow a customer to bring any compartment on a shelf into alignment with the associated access door; and

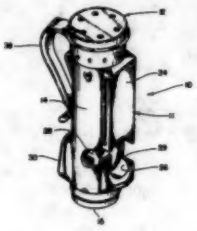
control means for activating the motor means at a predetermined time after a selection has been made and in either direction of rotation of the drum to bring the drum to a predetermined rest position at which it is stopped, the control means being operable to determine the number and location of empty compartments and to move the drum to a rest position at which it is stopped and in which the fullest section of the drum with the least number of empty compartments is disposed adjacent the viewing area of the cabinet.

4,927,052

GOLF BALL PACKAGE, HOLDER AND DISPENSER

Robert H. Marthaler, 942 Sycamore La., Bartlett, Ill. 60103, and Gregory A. Marthaler, 1969 Dorset Dr., Wheaton, Ill. 60187

Filed Nov. 7, 1988, Ser. No. 267,925
Int. Cl.[3] B65D 83/00
U.S. Cl. 221—64 11 Claims



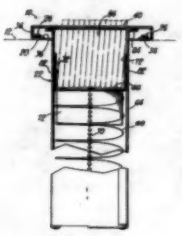
1. A golf ball package and dispenser, comprising: a one-piece plastic molded base adapted to receive a plurality of golf balls, having a generally cylindrical configuration with a closed bottom end and an open top end adapted to receive a plurality of golf balls, means for closing the open end of the base, and means for dispensing the golf balls adjacent the closed end of the base, said dispensing means including a side aperture in the base adjacent the closed end, said aperture being shaped to normally retain the golf balls in the base, said aperture being constructed to be deformable to permit removal of the golf balls through the aperture, said aperture being formed entirely in the one-piece base without additional ball retaining parts.

4,927,053

DISPENSERS

John T. Mayfield, III, Clarkston, Ga., assignor to The Meyer Company, Cleveland, Ohio

Division of Ser. No. 162,657, Mar. 1, 1988, Pat. No. 4,858,783.
This application Mar. 16, 1989, Ser. No. 325,303
Int. Cl.[3] B65G 59/00
U.S. Cl. 221—279 11 Claims



1. A dispenser which extends through an opening in a mounting surface, comprising:

I. means to position a face plate on the mounting surface, comprising:

(*a*) a mounting template having an opening corresponding to the opening in the mounting surface; and

(*b*) a plurality of mounting fasteners which fasten the mounting template to the mounting surface;

(*c*) the face plate having an opening corresponding to the opening in the mounting surface and keyed holes in order to capture the mounting fasteners so that the face plate is removably attached to the mounting template; and

II. a container assembly attached to the mounting surface comprising:

(*a*) an elongated container body from one end of which extends a plurality of mounting flanges;

(*b*) a plurality of container fasteners for fastening the container body to the mounting surface;

(*c*) a follower which slides inside the container body;

(*d*) a spring for forcing the follower and thus the items in the dispenser toward the face plate; and

(*e*) a stabilizer member attached to the container body and the follower for stabilizing the follower.

4,927,054

APPARATUS FOR SINGULARIZING GARMENT HANGERS

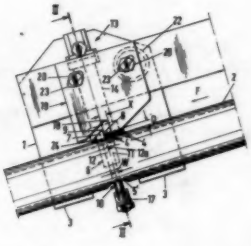
Hans Heinhold, Dietzenbach, Fed. Rep. of Germany, assignor to Sussman, Jennewein Bekleidungstechnik GmbH, Mörfelden-Walldorf, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 301,511

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1988, 3802805

Int. Cl.[5] B65G *59/00*

U.S. Cl. 221—289 **18 Claims**



1. Apparatus for singularizing objects, particularly garment hangers, having substantially hook-shaped suspendible portions of substantially circular cross-sectional outline with a predetermined diameter, comprising a ramp including an upper portion and a lower portion, said ramp being arranged to support a series of suspendible portions and having an inclination such that the suspendible portions thereon slide by gravity in a direction from said upper to said lower portion; an intercepting member disposed intermediate said upper and lower portions and having a section located in the path of movement of oncoming suspendible portions on said ramp so that the foremost oncoming suspendible portion comes to rest in response to engagement with said intercepting member; means for lifting successive suspendible portions of the series of suspendible portions above said member, including an elevator adjacent and located aheat of said section in said direction, and means for moving said elevator between a lower position beneath the suspendible portion which abuts said intercepting member and an upper position in which the elevator lifts the suspendible portion thereabove to a level such that the thus lifted suspendible portion can ride over and beyond said intercepting member in said direction; and a guide disposed above and defining with said intercepting member a channel for suspendible portions of successive objects, said guide extending from upstream to downstream of said intercepting member and said elevator, said channel having an inlet which is adjacent said elevator in the upper position of said elevator, said inlet having a width in said direction which is between about 1 and 2 D wherein D is said predetermined diameter, said guide having a recess which forms part of the channel and said elevator extending into said recess in said upper position thereof.

4,927,055

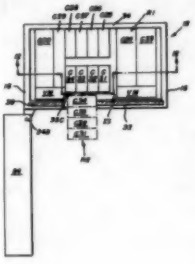
INCREASED COLUMN/SELECTIVITY VENDER

Phillip B. Groover, Woodstock, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Continuation of Ser. No. 68,936, Jul. 1, 1987, abandoned, which is a continuation-in-part of Ser. No. 911,152, Sep. 24, 1986, Pat. No. 4,722,455. This application Jun. 21, 1989, Ser. No. 370,100

Int. Cl.[5] B65G *59/00*

U.S. Cl. 221—67 **12 Claims**



1. A vend rack assembly for delivering vendable cylindrical products to discharge port means in the face of a vending machine comprising:

a plurality of vertical columns disposed side-by-side in a parallel relationship behind said face of said vending machine, the bottom of each of said columns communicating with said discharge port means, said columns including means for supporting products in stacks therein and being arranged in groups to provide space for respective products commensurate with anticipated sales of such products, some of said columns being fixed within said vending machine and certain of said columns indicating means for mounting said certain columns for at least partial removal thereof from the interior of said vending machine, said columns including at least tow different product storage configurations and capacities, to provide access to all of said columns for loading the same with said products and to maximize the number of groups of said columns within a given interior space of said vending machine;

wherein said columns are collectively contained side-by-side in at least first and second rows within a substantially rectangular area as viewed from the front of said vending machine, wherein said second row is parallel to said first row and said first row is fixed within said vending machine and said second row includes mounting means for said columns in said second row to permit said second row of columns to move outward from the interior of said vending machine to facilitate loading of products therein, said mounting means includes a hinged pivot means permitting said second row to swing away from said first row;

an interior rear wall opposite said vending machine face; and

a pair of sidewalls substantially extending from said rear wall to said face;

wherein said first row comprises a combination of vertically disposed corded double-deep product columns, single double-deep product columns and single-deep product columns disposed across said interior rear wall, and wherein said second row comprises a plurality of vertically disposed single-deep product columns in said mount-

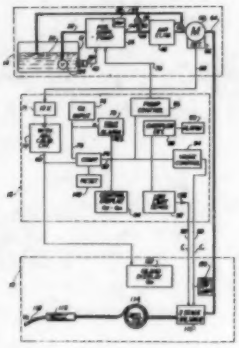
ing means adjacent the interior of said vending machine face.

4,927,056

OIL DISPENSING SYSTEM WITH CONTROLLED METERING AND METHOD

Richard S. Glover, Hollywood, Fla., assignor to RSL Industries, Inc., Cooper City, Fla.

Filed May 22, 1987, Ser. No. 53,344
Int. Cl.[5] B67D *5/16*
U.S. Cl. 222—1 **29 Claims**



1. A system for metering and dispensing at a low flow rate a high viscosity fluid from a source comprising:

means for obtaining said fluid from said source and supplying said fluid to a system line, said means for obtaining including means for maintaining a total dynamic head in said system line;

means for eliminating the air from said fluid flowing through said system line;

metering means for measuring the flow of said fluid and generating a representative electrical signal of said flow, said metering means disposed downstream of said means for eliminating with respect to the flow of said fluid through said system line;

controllable dispensing means at the end of said system line;

an adjustable means for correcting said representative signal based upon an initial calibration of said system accounting for slippage and initial pressure variations of said means for obtaining, means for eliminating, metering means and compression of said high viscosity fluid in said system line; and

means for determining and displaying the quantity of fluid dispensed based upon the corrected representative signal obtained from said metering means.

4,927,057

AUTOMATIC INFLATOR FOR INFLATABLE ARTICLES

Michael Janko, Richmond, Mich., and Matthew McAllister, Lexington, both of Mich., assignors to Inflation Technologies & Innovation, Anchorville, Mich.

Filed May 30, 1989, Ser. No. 359,875
Int. Cl.[5] B67B *7/24*
U.S. Cl. 222—5 **17 Claims**

1. An inflator for inflatable articles comprising:

a housing;

means, formed in the housing for discharging gas therefrom;

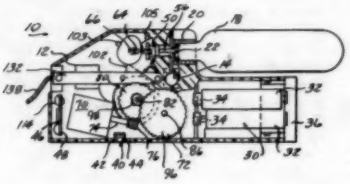
a pressurized gas canister attached to the housing and disposed in fluid flow communication with the gas discharging means;

a plunger movably mounted within the housing with respect to and facing the canister, the plunger having a canister piercing end;

an electrical power source mounted within the housing;

water sensor means, mounted on the housing and extending partially outward therefrom for generating an output signal when immersed in water;

actuating means, mounted within the housing and responsive to the output signal, for mechanically moving the plunger to urge the piercing end of the plunger into the canister;



a central processing unit, mounted within the housing and connected to the electrical power source, the actuating means and the water sensor means and executing a stored control program, the central processing unit being responsive to the output signal from the water sensor means to activate the actuating means when the water sensor means is immersed in water; and

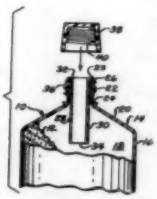
status indicator means, mounted within the housing and responsive to the central processing unit, for indicating the operative state of the inflator.

4,927,058

PACKAGE FOR A FLOWABLE MATERIAL SUSCEPTIBLE TO FLAVOR LOSS

Alan Nimmey, Sale, and Harry Hayes, Warrington, both of England, assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Jul. 20, 1988, Ser. No. 221,768
Int. Cl.[5] B65D *35/08, 35/14*
U.S. Cl. 222—106 **13 Claims**



1. A package for a flowable material susceptible to flavor loss, comprising;

an elongated collapsible tube defining a chamber to receive the material, said tube having a body portion and a tapered shoulder extending from the body portion, and a hollow neck having an inner end extending from the shoulder, and an outer end, said shoulder being in contact with the material and normally causing flavor loss of the material in the region of the chamber adjacent the shoulder with the body portion, neck and shoulder being of one-piece construction; and

an insert separate from the tube and comprising a tubular section having an outer end connected to the outer end of the neck, and an inner end extending into the chamber a sufficient distance to prevent extrusion of the material in the region of the shoulder through the neck.

4,927,059

DEVICE FOR DISPENSING A MULTICOMPONENT FLOWABLE SUBSTANCE

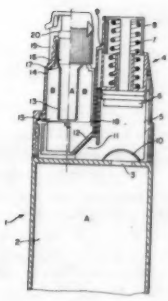
Juergen Fiedler, Nettetal; Albert Stoeffler, and Michael Bergmann, both of Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 279,480

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741087

Int. Cl.[5] B67D 5/52, 5/60; G01F 11/02

U.S. Cl. 222—136 4 Claims



1. A device for selectively dispensing a paste-like flowable mixture of first and second components, said device comprising:

a container forming a lower portion of said device, the uppermost portion of said container including an outlet; and

a dosing unit mounted upon an uppermost portion of said container, said dosing unit including:

a first valve flap covering said outlet of said container;

a spring-biased plunger mounted and guided within a cylinder, said cylinder including an outlet opening;

a second valve flap surrounding and closing the outside of said outlet opening of said cylinder;

a tubular element located above and proximate to said second valve flap;

a compartment surrounding and concentric with said tubular element, said compartment being open at its lower end facing said second valve flap;

said tubular element having at least one opening provided through its upper portion providing a pathway from said compartment;

said device providing for filling said container with a first component of said flowable substance, and said compartment with a second component of said flowable substance, for dispensing a striped-like combination of said first and second components; and

mounting means for providing the combination of said compartment and said tubular element as a replaceable portion of said dosing unit.

4,927,060

APPARATUS WITH STEAM TRAP FOR HEATING AND DISPENSING HOT LIQUIDS

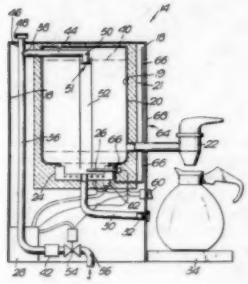
Malcolm R. Snowball, St. Leonards-on-Sea, and Cecil Hayes, Hastings, both of East Sussex, England, assignors to W. M. Still & Sons Limited, England

Continuation-in-part of Ser. No. 924,512, Oct. 29, 1986, abandoned. This application Apr. 28, 1988, Ser. No. 187,289

Claims priority, application United Kingdom, Jan. 8, 1986, 8600323; Sep. 4, 1986, 8621316

Int. Cl.[5] A47G 19/24; B67D 5/38, 1/08; A47J 31/00

U.S. Cl. 222—146.5 13 Claims



1. A hot liquid storing and dispensing unit comprising:

a closed hot water tank having a wall;

a housing containing the hot water tank;

an insulating jacket within the housing and surrounding the hot water tank;

an outlet dispensing tap;

means passing through the insulating jacket for connecting the dispensing tap to the hot water tank;

means outside the housing for actuating the dispensing tap;

a dispensing valve within the jacket coupled to the actuating means adjacent to the tank wall;

a hot liquid inlet conduit connected to a water supply and having a passage extending through the tank wall and opening vertically downwards into the hot water tank above a supply of water in the hot water tank; and

a steam trap associated with the hot liquid inlet conduit,

said steam trap including means for normally closing the inlet passage to prevent escape of steam from the hot water tank through the inlet passage and for opening the inlet passage in response to a predetermined head of water in the inlet passage to allow water from said supply to enter the tank,

wherein the steam trap comprises a trap member which is U-shaped in cross-section and which is supported just below the outlet of the hot liquid inlet conduit.

4,927,061

DISPENSING VALVE WITH ELASTIC SEALING TUBE

James P. Leigh, and Henry G. Roethel, both of Ravenna, Ohio, assignors to The Meyer Company, Cleveland, Ohio

Filed Sep. 22, 1988, Ser. No. 247,733

Int. Cl.[5] B65D 37/00

U.S. Cl. 222—212 4 Claims

1. A manually operable dispensing valve comprising:

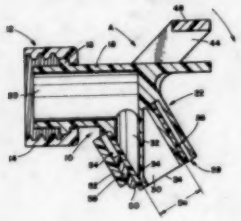
a body member including connecting means for connecting the body member to a fluid supply source, said body member including an elongated relatively rigid body portion extending outwardly from the connecting means and terminating in a free end:

a laterally opening discharge orifice in the rigid body portion adjacent the free end thereof and a fluid passageway extending through the body member for con-

ducting fluid from the supply source to the discharge orifice;

a resilient tubular member positioned over the rigid body portion in tensioned surrounding relationship thereto to sealingly overlie the discharge orifice;

operating means for deflecting the tubular member away



from the orifice to permit fluid flow therethrough, said operating means comprising an operating lever pivotally mounted on the body member and having an end joined to the tubular member at a location exterior of the body adjacent the discharge orifice to selectively deflect the tubular member away from the outlet orifice upon actuation of the lever.

4,927,062

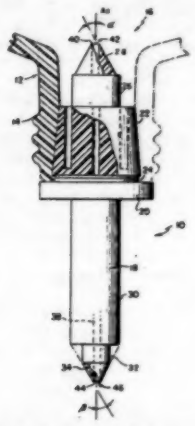
PRECISION MICRO-LITER DROP DISPENSER

James W. Walsh, 3832 Beech Ave., Baltimore, Md. 21211

Filed Sep. 22, 1988, Ser. No. 247,864

Int. Cl.[5] B65D *47/18*

U.S. Cl. 222—420 **18 Claims**



1. A dropper tip for the drop-wise dispensing of a liquid in drop volumes of less than 20 μl volumes from a container, comprising:

a dispensing stem having a cylindrical lumen therethrough formed along an axis from a liquid entry port at one end to an exit port at the other end, the lumen defined by a surface of revolution about the axis; and

a fitment intermediate the ends of said dispensing stem for engaging a neck of a container to position one portion of said dispensing stem and said entry port in the interior of the liquid container and to position the remaining portion of the dispensing stem and said exit port exteriorly of the container;

said entry port defined by a frusto-conical surface formed about the axis, the lumen extending along the axis through said frusto-conical surface to define a circular rim at the intersection of said frusto-conical surface and said surface of revolution, the circular rim having a minimum contact surface at said entry port to minimize surface area for the adhesion of bubbles at or adjacent to said entry port.

4,927,063

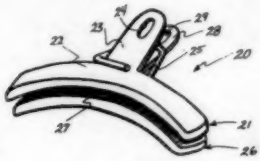
COMBINATION CAP HANGER AND VISOR PRESS

Gerald A. Fricano, 8 Watchet La., Fairport, N.Y. 14450

Filed Apr. 26, 1989, Ser. No. 343,895

Int. Cl.[5] A47G *25/10*

U.S. Cl. 223—84 **5 Claims**



1. A combination cap hanger and visor press, including:

first and second T-shaped gripping members each including a lever handle and a gripping crossbar, said gripping members pivotally connected for movement between open and closed positions and spring loaded toward said closed position;

said gripping crossbars mating with each other and defining therebetween a concave cavity curved in a plane substantially perpendicular to said lever handles, said gripping crossbars adapted to receive a cap visor between them, the curvature of said gripping crossbars and the force of said spring load combining to retain said cap visor in a desired shape; and

hanging means to hang said cap hanger and visor press.

4,927,064

CURVED DISPENSIBLE PADS

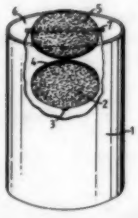
Robert Burgin, Schaffhausen, Switzerland, assignor to IVF Maschinenfabrik Schaffhausen, Switzerland

Filed Jul. 20, 1988, Ser. No. 221,712

Claims priority, application United Kingdom, Jul. 21, 1987, 8717143

Int. Cl.[5] B65D *5/72*

U.S. Cl. 225—106 **2 Claims**



1. A dispensing system, comprising:

a stack of pads overlying one another and stacked on a common axis, each of the pads having arcuate edges and the opposed arcuate edges of adjacent pads in sequence in the stack being joined by a single frangible bridge immediately between and adjacent the pads; and

a container for the stack, the container terminating at one end and toward one end of the stack in an elongate dispensing slot so that the pads are withdrawn in sequence through the slot;

the stack and the slot cooperating in use so that withdrawal of the then uppermost pad in a direction generally transverse to the axis of the stack and the slot causes the then next pad in the stack to be folded over the edge of the slot for fracturing the frangible bridge before that next pad is withdrawn;

the pads being formed from a resilient absorbent fibrous material in which elongate fibers run from one pad to the next pad via the frangible bridge and the frangible bridge is shaped and sized so that with the quantity and nature of the fibers running through the bridge, the bridge will withstand a straight pull between 200 and 400 grams, the material which makes up the pads and the frangible bridge being homogenous throughout the stack of pads.

4,927,065

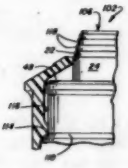
ADJUSTABLE METERING CLOSURE CAP

James M. Beck, Carol Stream, Ill., assignor to Creative Packaging Corp., Wheeling, Ill.

Continuation of Ser. No. 169,603, Mar. 17, 1988, abandoned. This application Apr. 13, 1989, Ser. No. 338,482

Int. Cl.[5] B67D *5/06*

U.S. Cl. 222—520 **13 Claims**



8. A closure cap for dispensing contents of a container, comprising:

a central post having a top surface and a substantially cylindrical imperforate peripheral wall, said cylindrical imperforate peripheral wall including a plurality of reduced wall peripheral portions formed in said peripheral wall and opening to said post top surface for metering the contents to be dispensed; and

a cap body reciprocally mounted on said central post and having an inner periphery which cooperates with said post peripheral wall to form a variable opening between said cap body inner periphery and said post peripheral wall and to provide a closure position below said reduced wall peripheral portion and a plurality of dispensing positions for dispensing the contents at a plurality of different rates as said cap body is moved on said post away from said closure position, said cap body being reciprocally mounted on said central post by a push-pull cooperation between a portion of said post having a lower and an upper stop position formed thereon and a projection formed on an inner wall of said cap body which abuts said lower and upper stop positions to form closed and full open dispensing positions, a portion of said reciprocal movement of said cap body being provided by threads cooperating between said post and said inner cap body wall.

4,927,066

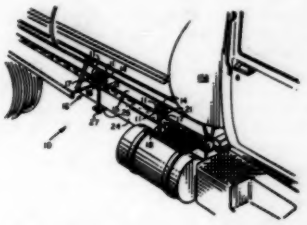
GAS AND OIL TRUCK TANK MOUNTING STRAP REPLACEMENT KIT

Louis Hemmerich, 62-69 60th Rd., Maspth, N.Y. 11378, and Ronald Strait, 80-15 30th Ave., Apt. 1, Jackson Heights, N.Y. 11370

Filed Dec. 2, 1988, Ser. No. 278,756

Int. Cl.[5] B60P *3/22;* **B65D** *88/12*

U.S. Cl. 224—42.45 R **7 Claims**



1. A gas and oil truck tank structure mounting strap replacement kit, comprising, a plurality of assemblies, each assembly including a pair of parallel mounting plates adapted for mounting to tank bearing channels of a tank structure when carried on a frame of a truck, a vertical plate adapted to be releasably attached to said pair of mounting plates, a rod adapted to be received by the vertical plate, and a horizontal strap plate adapted to be received on said rod and adapted for securing to the frame, for securing said tank structure to a truck vehicle.

4,927,067

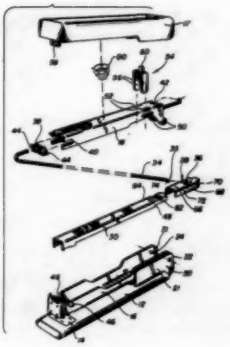
STAPLING MACHINE

John Leszczak, Roselle Park, N.J., assignor to The Bates Manufacturing Company, Hackettstown, N.J.

Filed Jul. 27, 1988, Ser. No. 225,069

Int. Cl.[5] B25C *5/02*

U.S. Cl. 227—128 **3 Claims**



1. A stapling machine comprising:

a staple machine for receiving staples, having a staple discharge opening at one end;

a cover pivotally mounted to the magazine at the other end, pivotally movable between a closed position overlying the magazine and an open position;

a cap mounted a distance from the cover and pivotally movable therewith;

a staple supporting means within the magazine for support-

ing staples therein comprising a rail having a top wall and two side walls;

a follower means slidably mounted on the supporting means for urging staples toward the discharge opening;

a spring means secured to the cover and to the follower means for urging the follower to slide away from and toward the staple discharge means and to urge the cover closed;

detent means within the magazine coacting with the follower to prevent the follower means from sliding toward the discharge means when the cover is open, said detent means comprising a shoulder in a side wall of the rail;

wherein the follower comprises a top wall having two side walls, at least one wall having a lip thereon which coacts with the shoulder;

an actuator means mounted to the cover coacting with the follower to release the follower from the detent means when the cover is pivoted to a substantially closed position thereby permitting the follower to slide toward the discharge opening;

wherein the actuator means coacts with the cap to release the follower when the cover is in a substantially closed position; and

wherein the actuator comprises a stirrup having two fingers and a toe thereon, the fingers slidably mounted in the cover and adapted to coact with the follower and the toe adapted to coact with the cap.

4,927,068

METHOD FOR HEATING A PATTERNED SUBSTRATE

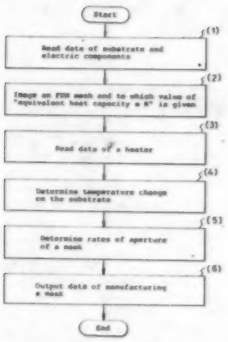
Hiroyuki Naka, Osaka; Tomohide Hirono, Hirakata; Naoki Suzuki, Sakai, and Takashi Ichiyanagi, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 23, 1988, Ser. No. 288,876

Claims priority, application Japan, Dec. 25, 1987, 62-330721

Int. Cl.[5] B23K *1/12, 1/19*

U.S. Cl. 228—103 **2 Claims**



1. A method for heating a substrate, having a plurality of electronic components at coordinates (i, j) on the substrate, using a mask having a plurality of apertures, comprising the steps of

(1) obtaining a respective heat transfer rate of an aperture associated with a respective coordinate aperture (R (i, j)) to make the temperature of the respective coordinate, as shown in the following equations (1) and (2), meet a respective desired temperature:

$$T_{ij}^{\tau+\Delta\tau} = \frac{\lambda\Delta\tau}{(C_R\gamma_R + C_S\gamma_S\delta_S/h)\,\delta_1\delta_2}\left\{\frac{\delta_2}{\delta_1}(T_{i+1,j}^{\tau} + T_{i-1,j}^{\tau} - \right. \quad (1)$$

-continued

$$\left. 2T_{ij}^{\tau}) + \frac{\delta_1}{\delta_2}(T_{i,j+1}^{\tau} + T_{i,j-1}^{\tau} - 2T_{ij}^{\tau}) + \frac{\delta_1\delta_2 q(\tau)}{\lambda}\right\} + T_{ij}^{\tau}$$

$$q(\tau) = \alpha(T_{air}^{\tau} - T_{ij}^{\tau}) - \quad (2)$$

$$R(i,j)C_\sigma \frac{\left(\frac{T_{ij}^{\tau}+273}{100}\right)^4 - \left(\frac{T_w+273}{100}\right)^4}{\frac{1}{\epsilon_1}+\frac{1}{\epsilon_2}-1}$$

wherein

T_{ij}^{τ}: temperature of a coordinate (i, j) on said substrate,

τ: time

ΔT: a time interval

C_R: specific heat of said substrate

λ: thermal conductivity said substrate

γ_R: specific gravity said substrate

C_S: specific heat of one of said electronic components,

δ_S: representative thickness of one of said electronic components,

γ_S: specific gravity said one of electronic components,

h: thickness of the substrate,

δ_1, δ_2: long and broad length of said coordinate,

T_{air}^{τ}: temperature of (ambient) atmosphere in the heater,

α: convention heat transfer coefficient,

T_w: temperature of the heater,

C_σ: Stefan-Boltzmann's constant,

$q(\tau)$: quantity of heat flux in a unit area for a unit time interval from the heater source at every time interval $\Delta\tau$,

ϵ_1: emissivity of said substrate,

ϵ_2: emissivity of the heater,

$R_{(i,j)}$: heat transfer rate of an aperture corresponding to the coordinate area δ_1 δ_2 and

(2) repeating step (1) for each of the plurality of coordinates.

4,927,069

SOLDERING METHOD CAPABLE OF PROVIDING A JOINT OF REDUCED THERMAL RESISTANCE

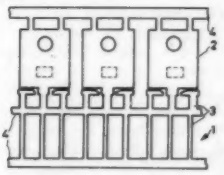
Takao Ushikubo, Kawagoe; Yasuhiro Iwasa, Wako, and Yukinori Yamaji, Yamagata, all of Japan, assignors to Sanken Electric Co., Ltd., Saitama, Japan

Filed Jul. 10, 1989, Ser. No. 377,906

Claims priority, application Japan, Jul. 15, 1988, 63-176386; Mar. 17, 1989, 1-65671; Mar. 17, 1989, 1-65672

Int. Cl.[5] B23K *1/12, 31/02*

U.S. Cl. 228—123 **15 Claims**



1. A method of soldering two members together, which comprises:

(a) placing a body of solder together with a flux between the two members;

(b) heating the solder and the flux to a prescribed temperature above the melting point of the solder and above a flux activation temperature at which the flux generates a gas;

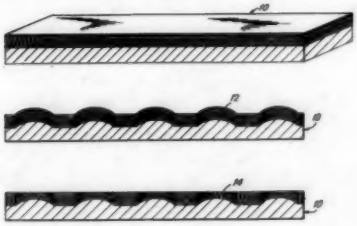
(c) maintaining the solder and the flux at the prescribed temperature for a preassigned length of time; and

(d) exerting a compressive force on the solder through at least either of the two members in order to drive off the gas bubbles generated by the flux from the molten body of solder and hence to provide a joint of reduced thermal resistance.

4,927,070
METHOD FOR MAKING MULTI-COLORED COMPOSITE LAMINATES

Steven D. Kretchmer, 48 Francis La., Greenwich, Conn. 06831, assignor to Steven D. Kretchmer, Greenwich, Conn. and Stern Metals, Inc., Attleboro, Mass.

Filed Mar. 10, 1989, Ser. No. 321,597
Int. Cl.[5] B23K *20/04, 31/00*
U.S. Cl. 228—155 **23 Claims**



1. A method for making multi-layered composites comprising the steps of:

stacking a plurality of sheets in a predetermined color sequence;

solid-phase bonding said sheets into a composite laminate;

forming a raised pattern on an outer surface of said laminate by passing said laminate through a patterned roller;

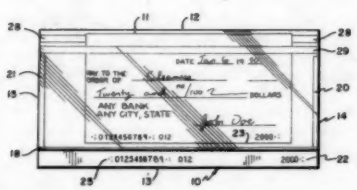
removing said raised patterns to form a substantially flat surface and to expose portions of sheets other than said outer surface; and

rolling said composite laminate to a finished dimension having a flat surface and color design thereupon due to said exposed sheet portions.

4,927,071
DOCUMENT CARRIER

Daniel J. Wood, 123 Calle Pena, Santa Fe, N. Mex. 87501

Filed Mar. 29, 1989, Ser. No. 329,520
Int. Cl.[5] B65D *27/00, 27/04;* **G06K** *19/06*
U.S. Cl. 229—71 **7 Claims**

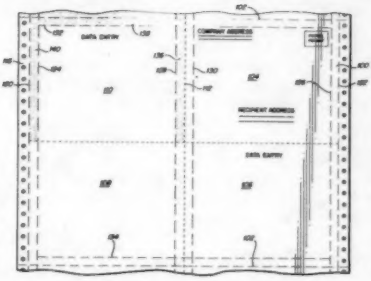


1. The document carrier which comprises a rectangular back sheet and a rectangular front sheet, the back sheet being provided with a surface of vellum to accept magnetic indicia, said front sheet being formed of translucent material through which the document can be easily read, said front and back sheets being secured by glue lines along the bottom edge and along at least one side edge, pressure sensitive adhesive bars, positioned to seal an inserted document in said document carrier, the pressure sensitive adhesive bars being of a type that permits the front sheet and the back sheet to be easily peeled apart to allow insertion of the document, said bars being located inside the pocket into which the document is to be inserted, whereby the pressure sensitive adhesive will hold the document inside the carrier permitting the document to be removed without damage.

4,927,072
MAILER

Richard A. Jenkins, Wheeling, and Wilbur P. Hutchinson, Mount Prospect, both of Ill., assignors to Moore Business Forms, Inc., Grand Island, N.Y.

Continuation-in-part of Ser. No. 911,425, Sep. 25, 1986, abandoned. This application Aug. 11, 1988, Ser. No. 230,916
Int. Cl.[5] B65D *27/10, 27/34*
U.S. Cl. 229—92.3 **6 Claims**



1. A mailer comprising:

a generally rectilinear sheet of material having respective orthogonally related edges;

first and second foldlines extending in said sheet generally perpendicular one to the other, generally parallel to said orthogonally related edges, respectively, and defining first and second panels and third and fourth panels of said sheet, respectively, on opposite sides of said first foldline, said fourth and first panels and said second and third panels, respectively, lying on opposite sides of said second foldline;

first lines of adhesive along the edges of said sheet on one face thereof such that, when said sheet is folded about said first foldline to register the first and fourth panels one with the other and the second and third panels one with the other and to register portions of the second foldline each with the other, the corresponding edges of the folded sheet may be secured one to the other;

second lines of adhesive along edges of the face of said sheet opposite said one face such that, when the registering first and fourth panels and said second and third panels are folded about the registering second foldline portions, the corresponding edges of said fourth and third panels may be secured one to the other therealong whereby at least a four-ply mailer may be formed; and

lines of perforations extending along the margins of said sheet inset from said edges thereof and generally parallel thereto, said marginal lines of perforations registering one with the other when said sheet is folded about said first foldline, the registering marginal lines of perforations of said first and fourth panels lying in registration with the registering marginal lines of perforations of said second and third panels when said sheet is folded about said second foldline to form marginal tear strips about two sides of the mailer, additional lines of perforations on opposite sides of and adjacent to said first foldline and extending parallel thereto, said additional lines of perforations being registerable one with the other when said sheet is folded about said first foldline, the registering additional

lines of perforations of said first and fourth panels lying in registration with the registering additional lines of perforations of the second and third panels when said sheet is folded about said second foldline to form an additional marginal tear strip along another side of said mailer whereby the marginal tear strips may be removed and the mailer opened, said second lines of adhesive extending about the edges of one of said third and fourth panels coincident with the corresponding edges of said sheet and also about a margin of one of said third and fourth panels adjacent said first foldline, the registering marginal lines of perforations of said first and fourth panels and said second and third panels being inset from said first lines of adhesive and a portion of said second lines of adhesive when said sheet is folded to form said four-ply mailer and the registering additional lines of perforations of said first and fourth panels and said second and third panels being inset from the remaining portion of said second lines of adhesive when said sheet is folded to form said four-ply mailer.

4,927,073

FOLDABLE AND STERILIZABLE COMPARTMENTALIZED ORGANIZER

Ruth Esposito, 1008 Spruce St., Philadelphia, Pa. 19107

Filed Oct. 13, 1988, Ser. No. 257,453
Int. Cl.[5] B65D *5/36*; A61B *19/02*
U.S. Cl. 229—117.07 **28 Claims**

1. A packaged sterilant organizer comprising

a sealed package formed of sterilizable, contamination-impermeable material, and

a folded compartmentalized tray completely enclosed in said package and packaged in a substantially collapsed condition and having a bottom, a plurality of wall members foldably attached to the bottom, an operating strap for erecting said tray into an open box having a plurality of compartments, and means for locking said tray into the erected condition,

a sterilizable, elongated semi-rigid sheet having a central area, a first side foldably attached to the central area, a second side foldably attached to the central area, a first end piece foldably attached to the central area, a second end piece foldably attached to the central area, and a tongue having a first end portion and a second end portion, the tongue first end portion being connected to the first end piece, said first and second sides being folded equidistantly over said central area, said second end piece including a strap locking means for locking the second end portion of the strap to the second end piece, said second end piece being folded inward over said first and second sides, said tongue second end portion abutting the edge of the second end piece,

a plurality of transverse wall members extending across the central area between the first and second sides, each said transverse wall member including a slot,

said strap extending through said slots in said transverse wall members to said second end piece and being attached to the transverse wall member furthermost from said second end piece,

whereby when said strap is pulled outwardly from said second end piece, said first and second sides and said first and second end pieces are drawn perpendicular to said central area to erect side and end walls and said strap is locked to said second end piece to prevent recollapse of said tray, converting said sheet into a rigid compartmentalized tray.

3. A collapsible, sterilizable, compartmentalized tray for holding medical instruments and supplies for use in operating rooms and at bedside of a hospital patient, comprising

a bottom wall,

a first wall connected to the bottom wall,

a second wall connected to the bottom wall,

a third wall connected to the bottom wall,

a transverse wall extending across the bottom wall,

erecting and compartment forming means for erecting the first, second, and third walls in an erected condition and for forming a plurality of compartments, and

locking means for locking the first, second, and third walls in an erected condition,

said erecting and compartment forming means including

an operating strap having a first end portion and a second end portion,

the operating strap being connected to the second wall at the operating strap first end portion and being extendable over the bottom wall to the third wall forming a tray partition,

said transverse wall having a slot through which the operating strap extends so that when the operating strap second end portion is pulled towards the third wall the transverse wall is drawn perpendicular to the bottom wall in an erected condition,

said locking means including

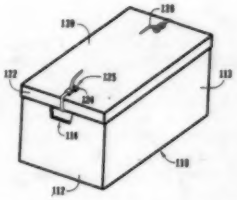
attachment means for attaching the second end portion of the operating strap to the third wall.

4,927,074

DOCUMENT CONTAINER

John D. LaRue, and John D. LaRue, Jr., both of 6720 Golf Dr., Dallas, Tex. 75205

Filed Jan. 25, 1989, Ser. No. 303,372
Int. Cl.[5] B65D *43/08*
U.S. Cl. 229—125.21 **31 Claims**



1. A document-handling container, comprising:

a box body, comprising end walls, side walls, and a floor,

said end walls, side walls, and floor being folded from a continuous common sheet of cardboard,

said end walls being thicker than said side walls of said box body,

said end walls also including handle holes therein;

a lid, consisting essentially of a folded continuous sheet of cardboard,

said lid having a peripheral lip thereon,

said lid also including holes therein close to said lip,

said lip including multiple plies of cardboard; and

a ratcheting closure tie, which is dimensioned to be threaded completely through said handle hole, and through a respective corresponding one of said holes in said lid, and which can lock to itself;

said holes in said lid being located, within said lid, such that, when said lid is emplaced on said box body, plural respective ones of said holes are in proximity to respective corresponding ones of said handle holes.

4,927,075

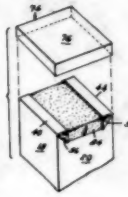
MULTI-PIECE FLAT TOP CONTAINER

Robert E. Lisiecki, Bloomfield, Mich., assignor to Pure-Pak, Inc., Walled Lake, Mich.

Filed Jul. 3, 1989, Ser. No. 374,928
Int. Cl.[5] B65D *43/14*
U.S. Cl. 229—125.34 **12 Claims**

1. A thermoplastic coated multi-piece falt top container including four respectively adjacent body panels, each connected to the adjacent body panel by a longitudinal score line,

two pairs of oppositely disposed top fold-down edge panels connected by a lateral score line to the respective body panels and to each other by extensions of said longitudinal score lines, said lateral score line forming intersections with said longitudinal score lines, a pair of diagonal score lines formed on each of one pair of said oppositely disposed top fold-down edge panels converging substantially from the intersections of the respective longitudinal and lateral score lines across each edge panel and forming a pair of corner gussets on each of the one pair of



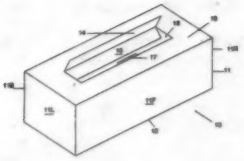
edge panels, characterized by said one pair of edge panels being folded outwardly and downwardly about said lateral score line onto the respective adjacent body panels, and said corner gussets being folded about said diagonal score line onto their respective edge panels, and the other pair of oppositely disposed top fold-down edge panels being folded inwardly about said lateral score line, and a membrane being sealed onto predetermined surfaces of each of said other pair of edge panels, said corner gussets and said first pair of edge panels.

4,927,076

MEDICAL APPLIANCE DISPOSAL CONTAINER

James L. Simpson, Indialantic, Fla., assignor to Hemex, Inc., Indian Harbor Beach, Fla.

Filed Jan. 24, 1989, Ser. No. 300,946
Int. Cl.[5] B65D *5/06*
U.S. Cl. 229—132 **20 Claims**



1. A discarded material container comprising a container body having a bottom and sidewalls and a container top enclosing said container, said container top having an opening therethrough for the insertion of discarded material into the container, said body being comprised of a laminate structure of compact fibrous material and a material that is effectively impervious to the passage of a fluid therethrough, and wherein said container top is formed of a first layer of said laminate structure having an opening therethrough that is shaped to define a lip extending from one side of said opening, and a second layer of said laminate structure, disposed adjacent to said first layer of said laminate structure, said second layer of said laminate structure having a cut therethrough to define a flexible tab overlying the opening in said first layer and being sized to effectively close said opening when urged downwardly onto said opening and engaged by said lip; and

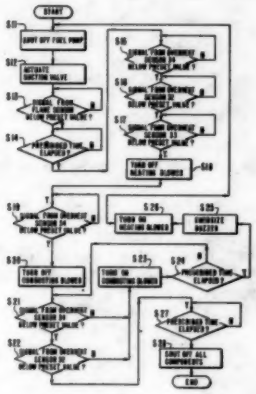
wherein said second layer of said laminate structure is scored along a top surface thereof to define a pivot line about which said tab is normally caused to be urged upwardly away from said opening.

4,927,077

HEATER DEVICE FOR MOTOR VEHICLE

Masaki Okada, Yokohama, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Nov. 10, 1987, Ser. No. 118,947
Claims priority, application Japan, Nov. 13, 1986, 61-270618
Int. Cl.[5] G05D *23/00*
U.S. Cl. 237—2 A **7 Claims**



1. (THREE TIMES AMENDED) A heater apparatus for a motor vehicle, comprising:

a burner for combusting fuel and producing hot combustion gas;

a heat exchanger connected to the burner and being operable to transfer heat between the combustion gas from the burner and heating air to be introduced into a passenger compartment of the motor vehicle;

means for detecting when the burner ceases operation and outputting a signal indicative of a ceased operation condition;

temperature detecting means connected to the heater apparatus for detecting the temperature of the heater apparatus and outputting a signal indicative of an over heat condition;

blower means in fluid communication with the heater apparatus; and

means operable in response to the over heat condition signal and the ceased operation condition signal for actuating the blower means to introduce air into the heater apparatus, thereby lowering the temperature of the heater apparatus.

4,927,078

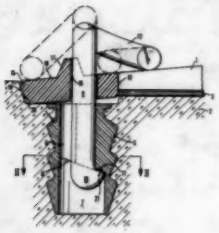
DEVICE FOR ELASTICALLY AND RAPIDLY FIXING A RAILWAY RAIL

Gerard Vanotti, Maillat, France, assignor to Etablissements S.A., Oyonnax, France

PCT No. PCT/FR87/00493, § 371 Date Jul. 29, 1988, § 102(e) Date Jul. 29, 1988, PCT Pub. No. WO88/04342, PCT Pub. Date Jun. 26, 1988
PCT Filed Dec. 11, 1987, Ser. No. 246,816
Claims priority, application France, Dec. 12, 1986, 86-17614
Int. Cl.[5] E01B *9/48, 9/60*
U.S. Cl. 238—349 **16 Claims**

1. A securing device, for securing railway rails on cross ties, comprising a rod having a first end and a second end and a longitudinal axis, said first end including a spring head, shaped as an open ring, which is adapted to rest against a rail shoe, said second end including an inclined heel, off-centered from said longitudinal axis, defining a hook which is adapted to cooperate with a hooking surface, and means for progressively ten-

sioning said spring head on the rail shoe, comprising a surface inclined upwardly in the direction of the rail shoe, for guiding



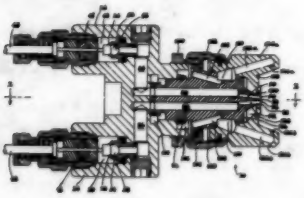
said spring head of said rod to a position over the rail shoe as said spring head of said rod is moved by a half-turn around said longitudinal axis.

4,927,079

PLURAL COMPONENT AIR SPRAY GUN AND METHOD

David H. Smith, Redwood City, Calif., assignor to Binks Manufacturing Company, Franklin Park, Ill.

Filed Oct. 4, 1988, Ser. No. 253,262
Int. Cl.[5] B05B 7/08, 1/28
U.S. Cl. 239—11 22 Claims



1. A plural component external mix air spray gun, comprising a fluid nozzle having first and second hemispherically-shaped fluid outlet orifices having flat sides in facing and spaced relationship; means for delivering first and second liquid materials to said first and second fluid orifices, respectively, for emission therefrom in first and second hemispherically-shaped unatomized liquid streams that are inclined toward each other and come together along their flat sides beyond said orifices in a composite cylindrical stream of the first and second materials; and pneumatic means for mixing and breaking up the composite cylindrical liquid stream into an atomized spray downstream from said first and second fluid orifices, said pneumatic means including an air outlet orifice surrounding said first and second fluid orifices and means for delivering air to said air orifice for emission therefrom in surrounding relationship to the first and second liquid streams and the composite cylindrical stream.

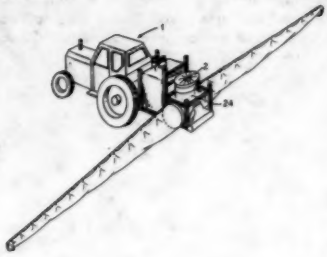
4,927,080

FIELD SPRAYING DEVICE

Erik Alsing, Nivå , Denmark, assignor to Hartvig Jensen & Co. A/S, Glostrup, Denmark

Filed Jan. 23, 1989, Ser. No. 299,415
Claims priority, application Denmark, Jan. 25, 1988, 336/88
Int. Cl.[5] B05B 1/20, 3/12
U.S. Cl. 239—77 3 Claims

3. A spraying device comprising an elongated spray beam with a plurality of spray nozzles spaced therealong, a source of compressed air, and a partially inflatable hose being connected to said source and being mounted on said beam adjacent said nozzles, said hose being made of a flexible material and having at least one slotted discharge opening positioned adjacent said nozzles, said spraying device including means for mounting said opening for pivotal movement along an axis extending



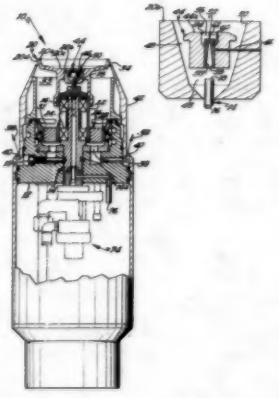
parallel to the beam with the hose yielding in shape and the nozzle being mounted separate from the slotted discharge opening so that a discharge of the nozzle intersects a discharge of the opening at a point spaced from the nozzle and opening and at an angle adjusted by the means for mounting.

4,927,081

ROTARY ATOMIZER

Kui-Chiu Kwok, Arden Hills, Minn., and Bernard J. Marchand, Le Raincy, France, assignors to Graco Inc., Minneapolis, Minn.

Filed Sep. 23, 1988, Ser. No. 249,423
Int. Cl.[5] B05B 3/10
U.S. Cl. 239—223 3 Claims



1. A rotary atomizer for applying coating materials in com-

bination with a turbine and a stationary center feed tube connected to a source of coating materials and having a discharge end, said rotary atomizer comprising:

a cup having a forward facing surface with a discharge edge and a central bore having a diameter;

a distributor adjacent said feed tube end and having an outside diameter substantially smaller than said central bore, said distributor further having an axial bore;

a diffuser pressed into said axial bore and comprising:

forward and rear ends;

an axial passage located coaxially with said feed tube for receiving material from said feed tube end and extending forwardly from said rear end of said diffuser, said rear end being adjacent said feed tube said axial passage tapering inwardly from said rear end to said front end; and

at least one radial passage extending radially outwardly from said axial passage and communicating with said axial bore said forward end of said diffuser being spaced rearwardly from the forward end of said distributor forming a depression in said forward end of said distributor; and

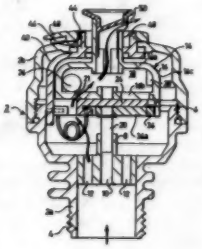
pins coaxially locating said distributor in said central bore of said cup and in annularly spaced relationship thereto, said distributor being connected to and supported by said cup only by said pins, said radial and axial passages and said depression being sized to substantially fill said depression with liquid coating materials when in operation and whereby a substantial majority of the paint exiting said center feed tube discharge end passes on to the forward facing surface of said cup through the annular space formed between said distributor and said cup, and said paint discharging from said distributor recess flowing substantially radially outwardly to said cup forward surface.

4,927,082

BALL-TYPE WATER SFRINKLER

Ilan Greenberg, Haifa, and Amir Cohen, Yuvalim, both of Israel, assignors to Lego M. Lemelshtrich Ltd., Netanya, Israel

Filed Aug. 15, 1989, Ser. No. 393,732
Claims priority, application Israel, Apr. 19, 1989, 90037
Int. Cl.[5] B05B *3/06*
U.S. Cl. 239—230 **19 Claims**



1. A ball-type water sprinkler, comprising a housing; a rotor mounted for rotation within the housing and including a chamber having a water inlet oriented to direct the water to flow circumferentially of the chamber; a ball freely movable within the chamber according to the direction of flow of the water therein; an impact element fixed to the rotor to be impacted by the ball and to rotate the rotor according to the direction of rotation of the ball therein; a water outlet from said chamber; and a nozzle communicating with the outlet and rotatable with the rotor; characterized in that:

said housing includes a fixed stop and a presettable stop presettable about the circumference of the housing;

said rotor includes two inlets oriented to direct the water to flow in opposite directions circumferentially around said chamber;

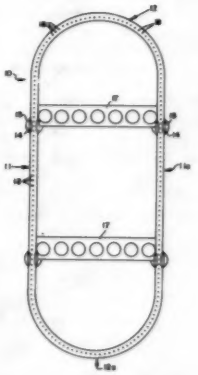
and said sprinkler further includes a shutter rotatable with the rotor and movably mounted with respect thereto to a first position covering one inlet and uncovering the other inlet to cause the water to flow in a first direction, or to a second position uncovering said one inlet and covering said other inlet to cause the water to flow in the opposite direction; an actuator member rotatable with the rotor and having a projection engageable with the fixed stop or the presettable stop during its rotation; and a coupling between the actuator member and the shutter and effective to move the shutter to its first position wherein said projection engages said fixed stop, or to its second position wherein said projection engages said presettable stop.

4,927,083

ELONGATED SHOWER HEAD

N. Charles Daunt, 6 Nautilis Rd., Hilton Head Island, S.C. 29928

Filed May 9, 1989, Ser. No. 439,519
Int. Cl.[5] B05B *15/06*
U.S. Cl. 239—282 **22 Claims**



1. An elongated shower head comprising a length of hollow tubing in the shape of an elongated loop having two spaced apart side sections and a bottom section joining respective lower ends of said side sections, said hollow tubing having an outer wall concentric of a central axis extending lengthwise of said loop, and means supporting said tubing length in a shower area with said side sections disposed vertically and said bottom section extending horizontally between said side section lower ends such that semi-circumferential portions of said tubing outer wall comprise one face of said loop facing outwardly of a shower area wall, said tubing outer wall portions of said side and bottom sections of said loop one face containing orifices spaced apart lengthwise of said sections and offset a distance circumferentially of the tubing from the centerline of said tubing outer wall semi-circumferential portions comprising said loop one face in the direction of the central region of said loop, said offset distances of said orifices in a central sector portion of said bottom section tubing being greater than the offset distances of orifices in sectors of outer portions of said bottom section tubing adjacent each said side section.

4,927,084

FUEL INJECTION VALVE

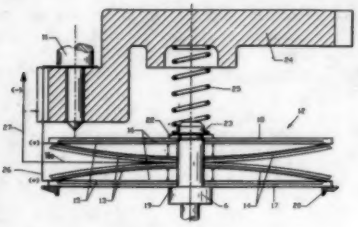
Burkhard Brandner, Werdohl, and Klaus Wenzlik, Iserlohn, both of Fed. Rep. of Germany, assignors to Atlas Fahrzeugtechnik GmbH, Werdohl, Fed. Rep. of Germany

Filed Dec. 28, 1988, Ser. No. 291,946

Claims priority, application Fed. Rep. of Germany, Jan. 7, 1988, 3800203

Int. Cl.[5] B05B *3/14*; F16K *31/02*; F02M *51/06*

U.S. Cl. 239—584 17 Claims



1. A valve, particularly a fuel injection valve, comprising a housing; a valving element mounted in said housing and being movable between first and second positions; and piezoceramic means for moving said valving element from said first to said second position, including at least two energizable laminated packages each of which is deformable in response to energization and each including a ceramic layer having a first surface and a second surface, a plate-like carrier at one surface of the ceramic layer, first conductor means at the other surface of the ceramic layer, and second conductor means, the carrier being disposed between the second conductor means and the ceramic layer, said second conductor means of said packages being disposed between said ceramic layers so that energization of said packages entails deformation of said packages such that the packages have convex sides confronting each other, said piezoceramic means further comprising an energy source having first and second poles, means for connecting one of said poles to the first conductor means of said packages, and means for connecting the second conductor means with the other of said poles.

4,927,085

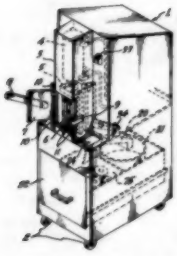
APPARATUS FOR RECYCLING OIL FILTERS

Gordon D. Oberg, 1717 S. Lake Stickney Dr., Lynnwood, Wash. 98207

Filed Dec. 21, 1988, Ser. No. 288,321

Int. Cl.[5] B30B *1/32*; B02C *19/08*

U.S. Cl. 241—36 6 Claims



1. Apparatus for recycling an oil filter comprising a housing having an elongated compartment sized to receive the oil filter and having a first end adapted to engage such filter, a crusher plate mounted for movement lengthwise of said compartment toward and away from said first end, and means for moving said crusher plate in said compartment with sufficient force to collapse such filter, said crusher plate moving means including a fluid pressure jack connected to said crusher plate and control means for supplying fluid under pressure to said fluid pressure jack, said control means including a directional control valve actuatable to supply fluid under pressure to said jack so as to effect movement of said crusher plate toward said first end of said compartment and for moving said plate away from such first end automatically when force in excess of a predetermined force is applied against the oil filter by said crusher plate, said control means further including means for sensing the position of said crusher plate as it is moved away from said first end of said compartment and for automatically cutting off the supply of fluid under pressure to said hydraulic jack so as to stop such movement of said crusher plate when it reaches a predetermined position.

4,927,086

GRINDING PROCESS AND APPARATUS

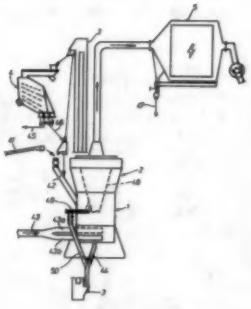
Heinrich Henne, Ennigerloh; Karl-Heinz Dammertz, Oelde; Lutz T. Schneider, Ennigerloh, and Gotthard Blaszczyk, Beckum, all of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Fed. Rep. of Germany

Filed May 14, 1985, Ser. No. 733,945

Claims priority, application Fed. Rep. of Germany, May 16, 1984, 3418197

Int. Cl.[5] B02C *15/00*

U.S. Cl. 241—80 8 Claims



1. A ring mill wherein fresh material is delivered to and comminuted at a grinding zone and desirable finished products of differing fineness classifications are continuously produced from a single grinding process having a grinding plate rotatable about a vertical axis, grinding elements engageable with the plate for comminuting material to be ground, a nozzle ring encircling said plate, and means for establishing an upwardly directed air stream via said nozzle ring of such velocity as to entrain and carry upwardly relatively fine constituents of comminuted material, said mill comprising first and second opposing and upwardly directed walls forming part of said nozzle ring and limiting its internal cross section; means for radially adjusting the position of one of said walls relative to the other to adjust the quantity and velocity of air passing through said nozzle ring to obtain a selected pneumatic preclassification between a first relatively fine narrow range classification of constituents capable of being entrained in said air stream and exhausted from said mill to form a first finished product and a second relatively coarse broad range classification of constituents which cannot be entrained in said air stream and are discharged downwardly through said nozzle ring by gravity; mechanical separating means; conveyor means for delivering all of said relatively coarse constituents of said second classification to said separating means, said separating

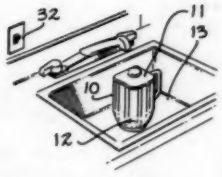
means being operable to extract from said coarse constituents a proportion of the relatively less coarse constituents of said second classification of substantially uniform size to form a second finished product having constituents coarser than those of said first finished product and finer than the remainder of said coarse constituents; and chute means for continuously delivering fresh material to said mill and returning the remainder of said coarse constituents downward by gravity to said mill for further grinding.

4,927,087

ICE SHAVING SYSTEM

John B. Palochak, 227 Chico Avenue, Santa Cruz, Calif. 95060

Filed Jun. 2, 1989, Ser. No. 360,858
Int. Cl.[5] B02C *18/42*
U.S. Cl. 241—100.5 **12 Claims**



1. A system for reducing larger pieces of material to pieces of smaller size, said system comprising:

(a) a container in which said larger pieces of said material are reduced to said pieces of smaller size, said container having an apertured top portion through which said larger pieces of said material are received and through which said pieces of smaller size are removed, said container having side and bottom portions that are substantially closed except for an opening in said bottom portion;

(b) a cutting device;

(c) a shaft carrying said cutting device, said shaft extending through said opening in said bottom portion of said container so that a first end of said shaft is located within said container and a second end of said shaft is located outside said container, said first end of said shaft being attached to said cutting device so as to support said cutting device for rotary motion within said container;

(d) a fitting disposed in said opening in said bottom portion of said container, said fitting being configured to enable rotary motion of said shaft while substantially precluding said pieces of smaller size from leaving said container via said opening in said bottom portion of said container;

(e) a sink having a drain opening, said drain opening being configured to receive said second end of said shaft carrying said cutting device;

(f) an electric motor positioned underneath said sink so that a drive shaft of said motor is substantially aligned with said shaft carrying said cutting device; and

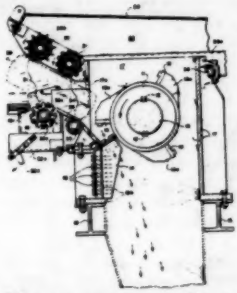
(g) an elongate extension device for longitudinally coupling said drive shaft of said motor to said second end of said shaft carrying said cutting device, said elongate extension device having a first end connectable to said drive shaft of said motor and a second end connectable to said second end of said shaft carrying said cutting device so that said elongate extension device extends generally coaxially with respect to both said drive shaft of said motor and said shaft carrying said cutting device, rotary motion of said drive shaft of said motor thereby causing concomitant rotary motion of said shaft carrying said cutting device, said cutting device thereby being made to rotate in contact with said larger pieces of said material within said container so as to reduce them to said pieces of smaller size.

4,927,088

TIRE FEEDING STRUCTURE FOR TIRE SHREDDING APPARATUS

John C. Brewer, Salt Lake City, Utah, assignor to Garbalizer Machinery Corp., Salt Lake City, Utah

Filed Feb. 27, 1989, Ser. No. 316,012
Int. Cl.[5] B02C *19/12*
U.S. Cl. 241—223 **20 Claims**



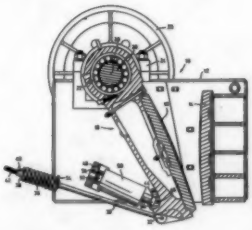
1. Tire shredding apparatus, comprising tire shredding mechanism; tire feeding structure comprising a set of rolls including lower and upper studded rolls for receiving tires fed flatwise thereinto, said set of rolls being rotatably mounted in mutually parallel relationship forwardly of said shredding mechanism and defining a downwardly sloping path of tire travel leading thereinto; and means for rotating said rolls toward said shredding mechanism.

4,927,089

ROCK CRUSHERS

Joseph Altmayer, Kitchener, Canada, assignor to E&E Seegmiller Limited, Kitchener, Canada

Filed Oct. 28, 1988, Ser. No. 263,865
Int. Cl.[5] B02C *1/04*
U.S. Cl. 241—264 **2 Claims**



1. In a jaw crusher for crushing rock of the type having a frame, a fixed jaw mounted on the frame and a movable jaw mounted on the frame for movement toward and away from the fixed jaw between a first set position which determines the maximum size of the gap formed between the jaws for a predetermined jaw setting and a first advanced position in which the movable jaw is located more closely adjacent the fixed jaw, and wherein the movable jaw is movable from the first set position to a retracted position in which it is more remote from the fixed jaw than it is when it is in the first set position so as to facilitate the removal of obstructing material from the bite which is formed between the jaws, the improvement of;

hydraulic control means for controlling the movement of the movable jaw between said first set position and said retracted position comprising;

(a) a double acting hydraulic ram having first and second ends mounted on the frame and movable jaw respectively, and being extensible and contractable between said ends,

said ram comprising a cylinder, a piston slidably mounted in the cylinder and dividing the cylinder into first and second fluid chambers, a rod extending from the piston and projecting from one end of the cylinder, one of said ends of said ram being located on said cylinder and the other being located on said rod, first and second fluid ports communicating with said first and second chambers respectively, movement of said piston resulting from expansion of said first fluid chamber serving to move the movable jaw to said first set position and movement of said piston resulting from expansion of said second fluid chamber serving to move the movable jaw to said retracted position,

(b) a source of high pressure hydraulic fluid,

(c) first fluid supply conduit means communicating between said source and said first fluid chamber to supply and vent hydraulic fluid from said first fluid chamber,

(d) second fluid supply conduit means communicating between said source and said second fluid chamber to supply and vent hydraulic fluid from said second fluid chamber,

(e) flow control means in said first and second fluid supply conduit means for simultaneously locking hydraulic fluid in said first and second fluid supply conduits to hold the extensible ram in a substantially rigid fixed length condition when in said set position during normal operation of the crusher,

(f) non-pneumatic pressure relief means communicating with said first fluid chamber to relieve the pressure in said first fluid chamber when the pressure in said first fluid chamber exceeds a predetermined control pressure to free the movable jaw for movement toward said retracted position.

4,927,090

METHOD AND APPARATUS FOR DISCHARGING SPOOLS

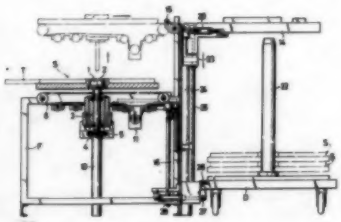
Masao Matsumoto, Toyama, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed May 24, 1988, Ser. No. 198,049

Claims priority, application Japan, May 30, 1987, 62-137486

Int. Cl.[5] B65H *19/22, 19/30*

U.S. Cl. 242—67.1 R **8 Claims**



1. An apparatus for discharging a spool from a reeling machine to a carrier car, the spool being disposed on a winding head of the reeling machine rotatable about a vertical axis, said apparatus comprising:

(a) at least one belt conveyor extending in a horizontal plane below the winding head and vertically movable to an elevated position above the winding head for lifting up the spool to remove the same from the winding head;

(b) at least one horizontal support arm extending in alignment with said conveyor for receiving therefrom the spool when said belt conveyor is disposed at said elevated position; and

(c) means defining a parking lot disposed beneath said support arm for admitting the carrier car.

4,927,091

DEVICE FOR WINDING AND UNWINDING A WEB OF MATERIAL

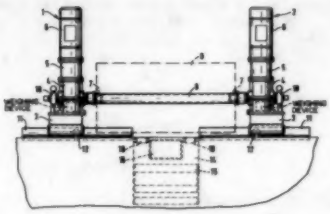
Peter Weiss, and Knut Welkers, both of Neuss, Fed. Rep. of Germany, assignors to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Apr. 26, 1988, Ser. No. 186,336

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1987, 3714329

Int. Cl.[5] B65H *19/06, 16/06*

U.S. Cl. 242—68.4 **8 Claims**



1. In a device for winding and unwinding a reel comprising a web of material on a core tube and comprising two separated uprights, in each of which is mounted a horizontal chuck which can engage the core tube, the improvement comprising a mechanism (15–17) that supports the reel (8) at the bottom during winding and unwinding, means for moving the supporting mechanism along with the reel, means for detecting the actual weight of the reel on the chucks and means for raising the supporting mechanism in accordance with the actual weight.

4,927,092

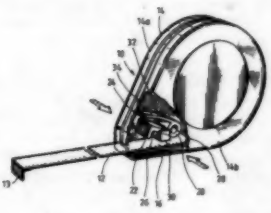
TAPE MEASURE LOCKING SYSTEM

Billy S. Ingram, II, Asheville, and David S. Chapin, Raleigh, both of N.C., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Jun. 30, 1988, Ser. No. 213,735

Int. Cl.[5] G01B *3/10;* **B65H** *75/30*

U.S. Cl. 242—107.2 **8 Claims**



1. A locking system for a coiled tape measure contained within a hollow flexible case having parallel sides separated by a wall comprising:

means for pressing said tape measure outwardly against the inside of the case wall;

means for biasing said means for pressing said tape outwardly against the inside of the case wall;

means for defeating said means for biasing, said means for defeating said means for biasing being activated by an inward force from one of the parallel sides of the coiled tape measure case;

wherein said means for defeating said means for biasing comprises at least one wedge member attached to the

inside of said case, said wedge member being constructed and arranged to engage and lift said means for pressing said tape against the inside wall of the case.

4,927,093

METHOD FOR BRAKING A MOVING THREAD-LIKE MATERIAL AND THREAD BRAKE FOR CARRYING OUT SAID METHOD

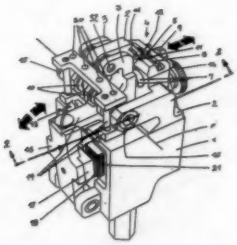
Erich Weidmann, Wetzikon, Switzerland, assignor to Gebrueder Loepfe AG, Wetzikon, Switzerland

Filed Jan. 9, 1989, Ser. No. 294,751

Claims priority, application Switzerland, Jan. 15, 1988, 00146/88

Int. Cl.[5] B65H *59/26*

U.S. Cl. 242—154 **24 Claims**



1. A thread brake comprising a brake body provided with a plurality of thread guide means for guiding a thread-like material, biasing means associated with said brake body for holding said brake body and said thread guide means in a first position so as to allow said thread-like material to be drawn through said thread guide means, a brake head having a plurality of brake elements and means for selectively biasing said plurality brake elements toward said brake body and against said thread-like material whereby said brake body is gradually moved from said first position against said biasing means by said thread-like material to a second position wherein said thread-like material is alternatively looped between said thread guide means and said brake elements for braking said thread-like material.

4,927,094

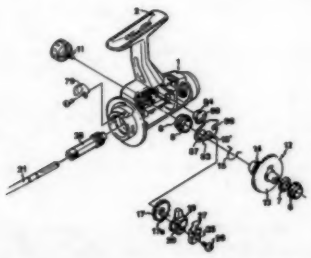
OPEN-FACE FISHING REEL OF THE FIXED-SPOOL TYPE

Bengt-Åke Henriksson, Svängsta, Sweden, assignor to ABU Garcia Produktion AB, Svagsta, Sweden

Filed Jul. 6, 1989, Ser. No. 376,103

Int. Cl.[5] A01K *89/01*

U.S. Cl. 242—242 **2 Claims**



1. Open-face fishing reel of the fixed-spool type, comprising

a housing;

a spindle rotatably and axially displaceably mounted in said housing;

a line spool non-rotatably connected to said spindle and axially fixed to one end thereof;

a drive shaft mounted in said housing and extending at right angles to said spindle;

a handle for rotating said drive shaft;

a driving gear non-rotatably mounted on said drive shaft;

driver means axially fixed on said spindle;

an oscillating gear rotatably mounted on a bearing pin and meshing with said driving gear, said oscillating gear having eccentric means thereon for engaging said driver means in order, upon rotation of the drive shaft, to move the spindle back and forth in its longitudinal direction and, thus, oscillate said line spool about a center of oscillation; and

shifting means for supporting said bearing pin for said oscillating gear, and means for pivoting said shifting means about the axis of said drive shaft in order to shift said bearing pin and, thus, displace the center of oscillation of the line spool to a desired position in the longitudinal direction of said spindle.

4,927,095

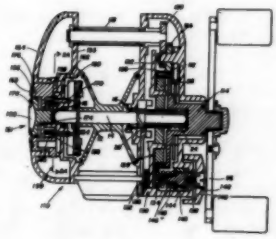
PLANETARY GEAR DRIVE FOR FISHING REEL

John N. Young, Fairfax, Calif., assignor to Charles C. Worth Corporation, Kentfield, Calif.

Filed Jan. 23, 1989, Ser. No. 298,929

Int. Cl.[5] A01K *89/015*

U.S. Cl. 242—261 **5 Claims**



1. A drive system for a fishing reel comprising:

a main frame;

a spool shaft rotatable on said frame and carrying a spool for a fishing line;

a driven pinion;

a handle shaft rotatable on said frame in axial alignment with said spool shaft;

a ring gear driven by said handle shaft;

a planetary gear carrier;

a plurality of planetary gears rotatable on said carrier engaging said ring gear and said driven pinion;

said planetary gears being equally spaced around said pinion;

means holding said planetary gear carrier against rotation on said main frame;

means for selectively keying said driven pinion onto one end of said spool shaft;

a coaxial recess in said handle shaft of a size to receive said driven pinion freely;

yieldable means biasing said driven pinion into driving engagement with said spool shaft; and

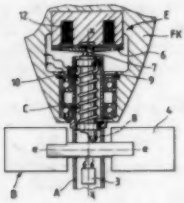
free spool cam means for engaging said driven pinion and shifting it axially into said recess to disengage said driven pinion from said spool shaft.

4,927,096

ROTOR SETTING SYSTEM IN CONJUNCTION WITH AERODYNAMIC BODY CONTROLS

Walter Kraaz, Taufkirchen, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, München, Fed. Rep. of Germany

Filed Feb. 20, 1987, Ser. No. 16,881
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1986, 3606423
Int. Cl.[5] F42B *15/027*; F41G *9/02*
U.S. Cl. 244—3.22 **9 Claims**



1. A rotor setting system for an aerodynamic body comprising:

rotor means comprising support means rotatably mounted on the aerodynamic body;

rotary drive means for driving said rotor means in rotation;

said rotary drive means comprising setting means for controlling the flight path of the aerodynamic body rotatably mounted on the support means;

first control means for controlling the rotation of the rotor means; and

second control means coupled to said setting means for controlling the orientation of said setting means, said second control means being coupled to said first control means by said support means and cooperating with said first control means to set said setting means, said second control means being coupled to said setting means via a first shaft means, said shaft means having a cam means mounted thereon cooperating with a projection means coupled to said setting means for changing the orientation of a surface of said setting means with respect to a longitudinal axis of said aerodynamic body, and said setting means being mounted on a second shaft means disposed transversely to said rotor means and having said projection disposed thereon in abutment with said cam means, said rotor means further being coupled to said second control means via spring means coupled to said first shaft means for limiting movement between said second control means and said rotor means, whereby when said first control means determines a position of said rotor means with respect to said aerodynamic body, said second control means adjusts the orientation of said setting means thereby to determine the flight path of the aerodynamic body.

4,927,097

CAGING SYSTEM

Terry S. Allen, Phoenix, and Patrick J. Wolke, Glendale, both of Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 29, 1988, Ser. No. 237,207
Int. Cl.[5] B64D *47/00*
U.S. Cl. 244—118.1 **14 Claims**

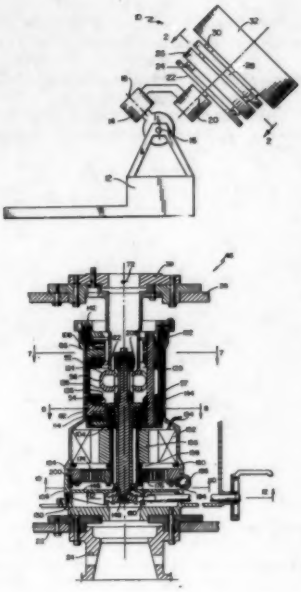
1. A caging system for a platform including at least one caging actuator comprising:

a first ring having an axis;

a second ring coaxial with the first ring;

a snubber member disposed between the first ring and the second ring; and

cam means for urging the first ring and the second ring against the snubber in a caged condition and for urging the



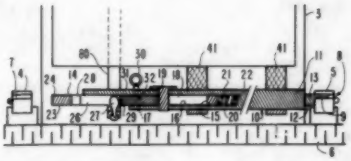
first ring and the second ring away from the snubber in an uncaged condition.

4,927,098

MECHANISM FOR FASTENING A LIFE-SAVING DEVICE OF THE SIMPLE EVACUATION SLIDE OR DINGHY TYPE FOR AIRCRAFT

Alain Depeige, Tournefeuille, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Oct. 18, 1988, Ser. No. 259,758
Int. Cl.[5] B64D *9/00*
U.S. Cl. 244—137.2 **12 Claims**



1. A mechanism for fastening a life-saving device for an aircraft, having at least one system of two fastening shoes fast with the floor of said aircraft, at least a first of said shoes comprising a recessed housing, said mechanism comprising:

a rod, one of the two ends of said rod comprising means for clipping and releasing with respect to the second shoe,

a counter-rod,

means for slidably mounting a first end of said counter-rod with respect to said rod, so that said counter-rod and said

rod can lie in at least two positions, a first, so-called retracted position and a second, so-called extended position,

means for applying an electric force between said rod and counter-rod to tend to position them in said extended position,

means for latching-unlatching said rod and counter-rod with respect to each other in at least one of the two positions,

means for controlling slide of one of said rod and counter-rod with respect to the other in a given direction,

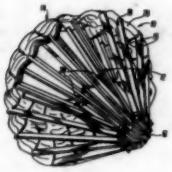
the second end of said counter-rod comprising an endpiece whose shape is substantially complementary of said recessed housing in said first shoe, so that said endpiece can be housed in said recessed housing.

4,927,099

AERODYNAMIC CONTROLLABLY VENTED PRESSURE MODULATING DROGUE

Richard C. Emerson, and John B. Sherman, both of DeLand, Fla., assignors to DeCel Incorporated, DeLand, Fla.

Filed Apr. 29, 1988, Ser. No. 188,489
Int. Cl.[5] B64D 17/18
U.S. Cl. 244—152 **7 Claims**



1. An aeronautical drogue including a plurality of support members, the support members having one end attachable to a connection means and the other end connected to a canopy, the canopy being formed of elastic material and having a generally annular or circular shape, the drogue providing an essentially constant drag/force at variable speeds and altitude with means for controllably venting the entire canopy to achieve aerodynamic pressure modulation so that the effective pressure area within the canopy of the drogue is modulated by equalizing the system pressure of the drogue from within the canopy; the venting means comprising a plurality of vent holes throughout the elastic canopy, the vent holes being geometrically and symmetrically arranged to allow pressure modulation and direction.

4,927,100

AIRFOIL CONFIGURATION

Eugene F. Provenzo, Jr., and Peter A. Zorn, both of Coral Gables, Fla., assignors to Patrician Corporation, Coral Gables, Fla.

Filed Nov. 11, 1988, Ser. No. 264,154
Int. Cl.[5] B64C 31/06, 3/58
U.S. Cl. 244—153 R **5 Claims**

1. An airfoil comprising:

(a) a sail having an essentially symmetrical planar configuration, said sail comprising an arcuate leading edge, a trailing edge and a tapered profile from the outermost lateral tips of its leading edge to the outermost lateral tips of its trailing edge; and

(b) a spoiler integral with and in articulating relationship to said sail along essentially the entire leading edge of said sail, said spoiler extending forward and downward from said leading edge and affixed at the lateral tips thereof to the underside of the sail;

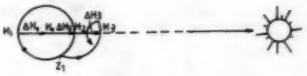
the inherent physical characteristic of the construction materials of each of said sail and said spoiler being sufficiently stiff to maintain each such airfoil component at a normal or pre-set aerodynamic configuration having a shallow dihedral angle and yet sufficiently resilient to permit controlled resistance to change in said dihedral angle of said sail in response to changing wind conditions.

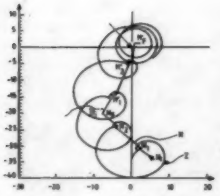
4,927,101

METHOD FOR TILTING THE MOMENT OF INERTIA OF A ROTATING FREE BODY IN SPACE INTO ANY GIVEN DIRECTION

Bernard Blancke, Le Cannet, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Apr. 25, 1989, Ser. No. 342,842
Claims priority, application France, Apr. 26, 1988, 88 05517
Int. Cl.[5] B64G 1/24, 1/38
U.S. Cl. 244—164 **4 Claims**





1. Method for tilting the kinetic moment (H_i) of a free body, in space, in stable rotation about its principal axis of inertia (Z) into any given inertial direction (sun, earth, astral body . . .) so as to attain this direction, the said free body comprising on the one hand actuators adapted to exert torques ($\pm\Gamma$) of fixed intensity and adjustable duration around an axis (X) perpendicular to the principal axis (Z); on the other hand an angular deviation detector (D_P) which during the rotation of the free body generates a sinusoidal deviation measurement signal indicative of the angle (Θ) between the plane (XZ) and the plane containing the axis of the torque (X) and the given inertial direction (sun, earth, astral body . . .) towards which one

can tilt the kinetic moment of the free body, the said procedure being characterized in that it consists in:

(a) identifying, if appropriate, the period of proper rotation of the free body, from the difference between two successive passages through zero of the sinusoidal signal of the angle (Θ) and therefore the instantaneous real speed of spin (ω), which gives the value of the initial kinetic moment ($H_i = I \cdot \omega$) of the free body in rotation;

(b) when the difference measuring signal for the angle (Θ) passes through zero with a positive (or respectively negative) speed, imparting by means of the actuator a first positive (or respectively negative) torque impulse (Γ) about the axis (X) for a predetermined period (T_1), whereby

displacing the initial kinetic moment (H_i) to (H_1) while the principal axis of inertia (Z) of the body in rotation follows a nutation movement around (H_1) to a point (Z_i);

(c) when the deviation measurement signal for the angle (Θ) again passes through zero with a positive (or respectively negative) speed and which corresponds to the instant when the principal axis of inertia (Z) reaches the point (Z_i), imparting a second positive (or respectively negative) torque impulse (Γ) around the axis (X) for a predetermined time (T_2), which has the effect of displacing the kinetic moment (H_1) to (H_2), while the principal axis of inertia (Z) of the body in rotation follows a nutation movement around (H_2) to a final point (Z_F);

(d) when the deviation measurement signal for the angle (Θ) again passes through zero with a positive (or respectively negative) speed and which corresponds to the instant when the principal axis of inertia (Z) reaches the final point (Z_F), imparting a third positive (or respectively negative) torque impulse (Γ) around the axis (X) for a predetermined time (T_1) identical to that of the first impulse, which has the effect of displacing the kinetic moment (H_2) to (H_F), which now merges itself with the final position (Z_F) of the nutation of the principal axis of inertia (Z) around (H_2), whereby nutation is nil and the tilting of the initial kinetic moment (H_i) of the body in rotation towards the given inertial direction (sun, earth, astral body . . .) has been secured by only three impulses and without residual nutation.

4,927,102

REVERSING DEVICE FOR MOVABLE PARTS WITHIN THE DEFLECTION AREA OF A RAILWAY SWITCH

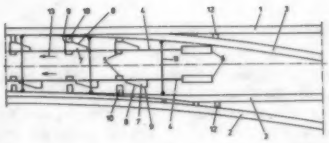
Gerald Durchschlag, Zeltweg; Alfred Lang, Wiesen; Franz Rotter, Zeltweg; Dieter Fritz, Fohnsdorf, and Heinz Kopilovitsch, Hetzendorf, all of Austria, assignors to Voest-Alpine Maschinenbau Gesellschaft m.b.H., Linz, Austria

Filed Nov. 7, 1988, Ser. No. 267,876

Claims priority, application Austria, Nov. 5, 1987, 2931/87; Sep. 16, 1988, 2274/88

Int. Cl.[5] E01B *7/02, 7/16*

U.S. Cl. 246—469 **12 Claims**



1. A reversing device for a railway switch, comprising:

a first pair of laterally-spaced fixed rails at one end of a deflection area;

two alternatively useful second pairs of laterally-spaced fixed rails at an opposite end of said deflection area, respective ones of said rails in said two pairs converging towards one another towards said deflection area;

said first pair of fixed rails being in longitudinal alignment with respective rails of one of said second pairs of fixed rails for providing a substantially straight longitudinal path through the railway switch and with respective rails of the other of said second pairs of fixed rails for providing a curved path through the railway switch;

two said rails at a same end of said deflection area having corresponding switchable portions which are fixed at said same end of said deflection area to provide continuations of respective ones of said rails, and which are supported for coordinated lateral deflection along the lengths thereof between one position in which said switchable portions are disposed to provide continuity through the railway switch along said substantially straight path and another position in which said switchable portions are disposed to provide continuity through the railway switch along said curved path;

said rails being supported on a fixed base;

at least one longitudinally elongated supporting rod supported on said fixed base by guide means so as to be aligned with said substantially straight path and disposed for longitudinal movement forwards and rearwards along said substantially straight path;

means for moving said at least one longitudinally elongated supporting rod substantially longitudinally forwards and rearwards along said substantially straight path;

each of said switchable portions of said rails being provided with a plurality of longitudinally-spaced, laterally-projecting first thrust supports;

said at least one supporting rod being provided with two sets of longitudinally-spaced, laterally-projecting second thrust supports;

each first thrust support having a laterally-facing thrust support surface means arranged to engage a respective laterally-facing thrust support surface means of a respective second thrust support upon longitudinal movement of said at least one elongated support rod to a selected position;

said thrust support surface means of one of said first and second thrust supports comprising a wedge-shaped ramp surface adjoining a main surface oriented substantially parallel to said substantially straight path;

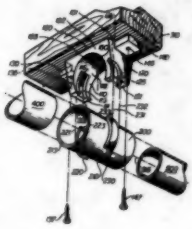
said thrust support surface means being disposed and oriented such that when corresponding thrust support surface means of said first and second supports are not in engagement and said at least one longitudinally-elongated supporting rod is moved longitudinally by said moving means to cause engagement, said wedge-shaped ramp surfaces of the thrust support surface means of one of said first and second thrust supports first engages, and cams against the thrust support surface means of the other of said first and second thrust supports, thereby deflecting the respective said switchable portion of said rails from alignment in one of said paths into alignment in the other of said paths, and further movement of said at least one longitudinally-elongated supporting rod causes the main surfaces of the thrust support surface means of said one of said first and second thrust supports to engage against the thrust support means of the other of said first and second thrust supports, thereby holding the respective switchable portion of said rails in alignment with the other of said paths, and reverse movement of said at least one longitudinally-elongated supporting rod progressively eliminates holding of the respective switchable portion of said rails in alignment with said other of said paths and removes camming action therefrom by said wedge-shaped ramp surfaces, permitting the respective switchable portion to return to alignment with said one of said paths.

4,927,103

METHOD AND APPARATUS FOR PIPING SUPPORT

Richard J. Nicholson, Rte. 2, Box 137-A, Dothan, Ala. 36301

Filed Nov. 14, 1988, Ser. No. 270,072
Int. Cl.[5] F16L 3/08
U.S. Cl. 248—62 3 Claims



1. An apparatus for supporting pipe such as PCV pipe or metal pipe, said apparatus comprising:

a standard pipe fitting

having an outer perimeter of its cross section and

configured with the addition of one or more mechanical protrusions wherein said protrusions are formed to have a shape of an arced segment of a slice of a cylindrical pipe somewhat larger than the fitting so that the outside diameter is the same as the inside diameter of the slice, the slice being taken perpendicular to the centerline of the larger cylindrical pipe and the inside diameter of the slice being equal to the outside diameter of the fitting and

a pipe support comprising

one or more arms,

each having an inner surface, and

each extending from a common base in a manner whereby the inner surface or surfaces of the arm or arms generally describe an area having a shape complimentary to said outer perimeter,

a gap between the end of the arm and the base or between the ends of the arms,

means for temporarily enlarging the gap in a manner whereby the gap is large enough for said pipe fitting to pass through the gap during installation,

means for reducing the enlarged gap, after installation, in a manner whereby said arm or arms fit snugly around said fitting in a manner whereby said fitting is held securely in place during use,

means for enlarging the gap, after installation, in a manner whereby the installed fitting may be removed from said support if said removal is intended, and

one or more recesses of sufficient number shape and position to snugly accommodate said protrusion or protrusions each said recess including an edge which engages an edge of its respective protrusion.

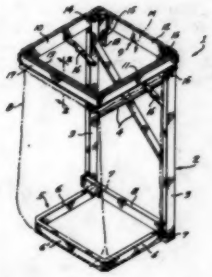
4,927,104

COLLAPSIBLE BAG-SUPPORTING FRAME

Robert W. Miller, 11731 26th NE., Seattle, Wash. 98125

Filed May 22, 1989, Ser. No. 355,599
Int. Cl.[5] A63B 55/04
U.S. Cl. 248—97 9 Claims

1. A bag support comprising a frame having a side section including elongated transversely spaced upright posts and means maintaining said posts in substantially parallel relationship, said side section having a top portion and a bottom portion, the bottom portion of said side section between said posts being open and unobstructed, a base section connected to the bottom end portion of said side section and including elongated transversely spaced legs, said legs having corresponding ends pivotally connected to the bottom end portions of said posts and being swingable to a nested position in which said legs extend close alongside and substantially parallel to said posts, said legs being swingable from said nested position through an angle of approximately 270 degrees to a supporting position extending substantially perpendicular to said posts for supporting said side section in upright position, stop means limiting swinging movement of said legs for normally maintaining them in supporting position, a top section forming a closed bag ring having an unobstructed outer periphery and an open interior, said top section including spaced stubs secured along the inner periphery of said bag ring and projecting transversely of and below said bag ring, said portions of said stubs projecting from said bag ring extending close alongside and being pivotally connected to the upper end portions of said posts for swingably connecting said bag ring to the upper end portions of said posts for movement between a bag-supporting position extending substantially perpendicular to said side section with said bag ring positioned above the top ends of said posts and a collapsed



position in which said top section is positioned close alongside but connected to said posts, means for normally maintaining said top section with said bag ring in its bag-supporting position but manually releasable for swinging of said bag ring to its collapsed position, and a clamping ring having an inner periphery of approximately the same size and shape as the outer periphery of said bag ring for unobstructed insertion of said clamping ring downward over the outer periphery of said bag ring with at least a portion of the inner periphery of said clamping ring substantially contiguously engaged against a portion of said bag ring, whereby, with said clamping ring removed, the bag can be inserted through the open interior of said bag ring and have its lip folded over said bag ring to extend downward alongside the outer periphery of said bag ring and, thereafter, said clamping ring can be inserted over said bag ring for clamping the entire circumference of the lip portion of the bag to said bag ring.

4,927,105

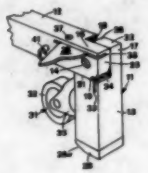
CONVERTIBLE LEG/ROLLER STRUCTURE

Patrick R. Habermann, 750 Conn Valley Rd., St. Helena, Calif. 94574

Filed Jan. 12, 1989, Ser. No. 296,813
Int. Cl.[5] A47B 91/00
U.S. Cl. 248—188.8 11 Claims

1. In a convertible leg/roller structure for supporting an object: a pivotally mounted leg movable about an axis between vertical and horizontal positions, a surface at one end of the leg for engagement with a supporting surface when the leg is in the vertical position, and a roller mounted on one side of the leg for engagement with the supporting surface when the leg is in the horizontal position, the surface at the end of the leg and the portion of the roller which engages the supporting surface

lying on an arc centered about the axis so that leg can be moved between the vertical and horizontal positions to engage



either the surface at the end of the leg or the roller with the supporting surface without lifting the object.

4,927,106

PRESENTATION PODIUM

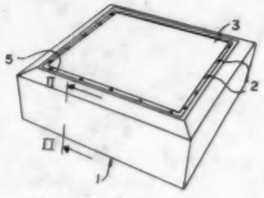
Johann Tomforde, Sindelfingen, and Monika Wall, Stuttgart, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Sep. 7, 1988, Ser. No. 241,248

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1987, 3729904

Int. Cl.[5] A47G *23/02*

U.S. Cl. 248—146 **19 Claims**



1. A convertible presentation podium comprising:

a closed, self supporting frame for receiving different insert elements each having different functional capabilities,

horizontal support bolts inwardly directed with respect to the frame and fastened in a region beneath an upper edge of the frame, and

one of the different insert elements inserted in the frame, the one of the different insert elements having means for cooperating with the horizontal support bolts to maintain an air gap between the one of the different insert elements inserted in the frame and the frame, the air gap having a uniform width and extending entirely around the one of the different insert elements inserted in the frame, wherein the means of the one of the different insert elements inserted in the frame are placed directly on the bolts which each have a given length.

4,927,107

SUPPORT FOR RECLINABLE BOARDS

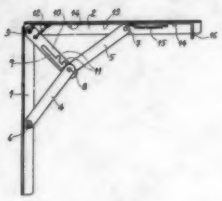
Ramon Mateo Maria, Narciso Monturiol Street s/no. 08339, Vilassar De Dalt, Barcelona, Spain

Filed Mar. 1, 1989, Ser. No. 317,370

Int. Cl.[5] A47G *29/02*

U.S. Cl. 248—240.4 **3 Claims**

1. A support for a reclinable object comprising two arms each having first and second ends, the first ends of said arms being pivotally joined together for movement about a common axis between folded and extended positions, releasable support means for maintaining said arms in said extended position, said releasable support means including first and second legs each having first and second ends, said respective first ends of each said leg being pivotally attached on a said respective arm and said respective second ends of said legs being pivotally connected on a common pin member, a cross leg member having one end pivotally connected to said common axis and another end having a plurality of engagement positions each for pivotally receiving said common pin member and means for releasing said common pin member from a said respective engagement position.



4,927,108

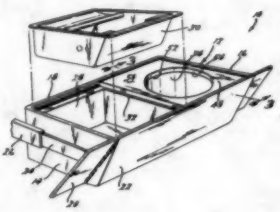
CUP HOLDER

Leonard J. Blazic, Washington, and Robert J. Janosko, Bloomfield Hills, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Jul. 13, 1989, Ser. No. 379,037

Int. Cl.[5] A47K *1/08*

U.S. Cl. 248—311.2 **4 Claims**



1. A convertible retainer mounted on an automotive vehicle console for movement into and out of a console housing, said convertible retainer adapted for ready conversion between a first combined ashtray and single cup holder mode and a second dual cup holder mode, comprising:

a generally rectangular-shaped retainer having a pair of lateral sides, a rear longitudinal side, and a forward longitudinal side, said retainer defining a generally rectangular first cavity adapted to receive a removable ashtray therein and a laterally adjacent raised rectangular-shaped horizontally disposed platform;

said raised platform including an upper horizontal wall and a generally annular vertical wall forming a second cylindrically shaped cavity disposed in the center of said horizontal wall adapted to receive a beverage cup therein, said second cavity having its principal axis disposed vertically;

said retainer rear and forward sides having means forming rear and forward laterally spaced longitudinally extending opposed tracks, respectively, such that each said rear and forward track being coextensive with and adjacent to the upper portion of its associated side at a predetermined elevation above said raised platform horizontal wall;

a rectangular plate member having front and rear edges, two opposing sides, and top and bottom planar surfaces, said plate member having a circular aperture extending therethrough said circular aperture having its center adjacent the center of said plate member and adapted to receive a beverage cup therein;

said plate member front and rear edges including means

operatively engaging said forward and rear opposed tracks, respectively, for lateral sliding movment of said plate member between a combined ashtray and single cup holder mode overlying said platform horizontal wall and a second dual cup holder mode overlying said first cavity;

whereby with said convertible retainer moved out of the console and with plate member in said first mode overlying said platform horizontal wall, such that said second cavity principal axis is aligned with said plate member circular aperture center, wherein said plate member circular aperture and said second cavity are adapted to conjointly receive a beverage cup therein; and

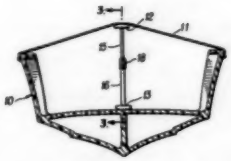
whereby with said convertible retainer moved out of the console and with said retainer in said second dual cup holder mode with said ashtray removed from said first cavity and said plate member overlying said first cavity, such that said plate member circular aperture together with said first cavity is adapted to receive a first beverage cup therein and said second cavity is adapted to receive a second beverage cup therein wherein the first and second beverage cups may be supported in a side-by-side manner.

4,927,109

WATER SHEDDING DEVICE FOR BOAT COVERS

Donald G. Wilson, 9731 Wenonga Rd., Shawnee Mission, Kans. 66206

Continuation-in-part of Ser. No. 858,121, May 1, 1986, abandoned. This application Oct. 11, 1989, Ser. No. 419,795
Int. Cl.[5] E04G *25/00*
U.S. Cl. 248—354.3 **4 Claims**



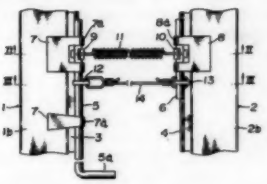
1. For use with a boat hull having a cover secured over the cockpit an apparatus adapted to be placed between the underside of the cover and the floor of the boat to form a peaked cover to shed rain and snow off the boat cover to prevent collapsing of the cover under the weight of collected rain or snow thereon, a boat cover water shedding device comprising a pair of boat cover and floor engaging members, a pair of telescopic variable length inner and outer support members, one end of the outer one of said variable length support members being externally threaded, the other ends of each variable length support members being smooth, said cover and floor engaging members being of mushroom shape having smooth bore bosses in the stem portion of the mushroom shape adapted to receive one end of said inner and outer support members, the portion of said cover and floor engaging mushroom-like members adapted for engagement with said floor and cover having checkered-like roughened gripping surfaces to form an anti-slip surface between the support rod, cover and boat floor, an externally fluted compression member having internal threads receivable over the externally threaded end of one of said variable length support members and a truncated conical cap defining a chamber at one end and being threaded at its other end complemental to the threads on the outer one of said variable length support members, and a split compression ring in said chamber receivable over the inner one of said telescopic members so that upon rotating said externally fluted compression member the split compression ring will be compressed to arrest relative movement between said telescopic variable length inner and outer support members to maintain a peaked condition of said cover to shed off rain and snow from said boat cockpit.

4,927,110

SLIDE LOCKING DEVICE FOR A CAR SEAT

Kenji Tsumura, Ikeda; Yukifumi Yamada, and Takami Terada, both of Kariya, all of Japan, assignors to Daihatsu Motor Co., Ltd., Osaka and Aishin Seiki Co., Ltd., Aichi, both of, Japan

Filed Jul. 17, 1989, Ser. No. 380,509
Claims priority, application Japan, Jul. 25, 1988, 63-98298
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—430 **4 Claims**



1. A slide locking device for locking slide motion of a car seat slidable longitudinally of a car body, provided with,

(a) a pair of lock plates fixed to said car body at both sides thereof under said car seat and each having a plurality of locking retained portions,

(b) a pair of lock shafts disposed at both sides of the lower surface of said car seat and rotatably supported thereto, comprising a driving side lock shaft and a driven side lock shaft rotatable in association with said driving side lock shaft,

(c) a driving side lock lever and a driven side lock lever each having an engaging portion engageable with one of said retained portions at each of said lock plates, supported to said lock shaft, and swingable of widthwise of said car body by rotation of said lock shaft,

(d) association means for rotating said driven side lock shaft in association with rotatable operation of said driving side lock shaft, and

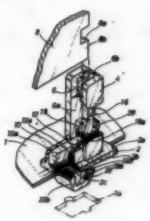
(e) a tension coil spring stretched between said driving side lock shaft and said driven side lock shaft and for biasing said engaging portions at said lock levers in the direction of engaging with said retained portions at said lock plates, said one tension coil spring operating to elastically engage said engaging portion of each of said lock levers with said retained portion at each of said lock plates.

4,927,111

BOARD MOUNT

Katsumasa Takahashi, Nagoya, Japan, assignor to Kitagawa Industries Co., Ltd., Japan

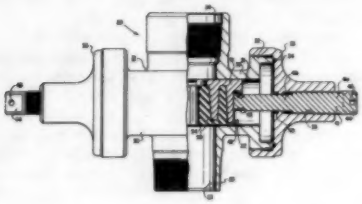
Filed Oct. 21, 1988, Ser. No. 260,568
Claims priority, application Japan, Nov. 2, 1987, 62-168347
Int. Cl.[5] H02B *1/02*
U.S. Cl. 248—500 **9 Claims**



1. A board mount for mounting a board on a mounting surface comprising:

a. a base plate for resting on the mounting surface;
b. a brace rising from an upper surface of the base plate, the brace having:
i. a slot for holding a corner of the board in the brace, and
ii. a resilient strip formed on the back of the brace with:
A. a locking pin on the lower end of the strip projecting forward into the slot, and
B. a hook means on the lower end of the strip for allowing insertion of a tool therein to move the resilient strip and retract the locking pin from said slot; and
c. an anchor descending from the underside of the base plate for inserting into a mounting hole provided on the mounting surface.

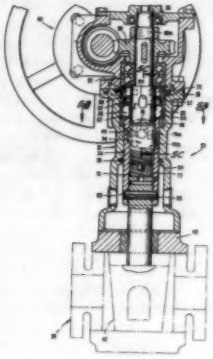
4,927,112
BLOWOUT PREVENTER
James A. Wilson, Dallas, Tex., assignor to Doulbe-E Inc., Dallas, Tex.
Division of Ser. No. 154,061, Feb. 9, 1988, Pat. No. 4,844,406. This application Jun. 19, 1989, Ser. No. 368,271
Int. Cl.[5] E21B *33/06*
U.S. Cl. 251—1.3 **7 Claims**



1. A seal assembly for a blowout preventer comprising:
a ram plate adapted to slideably fit in a blowout preventer body side chamber including only a substantially rectangular top backup plate, an integral retainer sidewall dependant from said backup plate, and a dependant pin secured at a top end to said top backup plate spaced in front of said retainer sidewall; and
an elastic seal substantially rectangular in horizontal cross section coupled with said ram plate below said backup plate within said retainer sidewall, said seal overlapping a front edge of said backup plate and opposite end edges of said backup plate and said retainer sidewall, and a socket in said seal opening from a top face thereof and spaced from a back edge of said seal and sized and shaped to receive said dependant pin on said ram plate for attaching said seal on said ram plate.

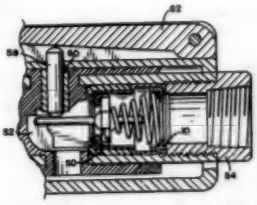
4,927,113
VALVE CONTROL MECHANISM
Irving J. Heinen, 78-086 Lago Dr., La Quinta, Calif. 92253
Continuation of Ser. No. 216,727, Jul. 8, 1988, abandoned. This application Sep. 14, 1989, Ser. No. 407,440
Int. Cl.[5] F16K *25/00*
U.S. Cl. 251—165 **5 Claims**

3. A plug-type valve including
a plug adapted to rest on a seat in the valve, and
a valve operator for lifting the plug off the seat, said valve operator including
a spindle having a pair of diametrically opposed recesses therein, and
a clutch-type mechanism comprising a sleeve threadably connected to the spindle and a pair of diametrically opposed roller elements which are mounted to move linearly a predetermined distance between a position where the roller elements are aligned with the recesses



and a displaced position where the roller elements are not in alignment with the recesses.

4,927,114
TILT VALVE CARTRIDGE
David J. Baker, Waverly, N.Y.; Kenneth J. Dubuque, Sheshequin, Pa.; John M. Estep, Granville Summit, Pa., and Charles J. Hix, Jr., Ulster, Pa., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.
Filed Mar. 17, 1989, Ser. No. 324,902
Int. Cl.[5] F16K *51/00*
U.S. Cl. 251—240 **9 Claims**



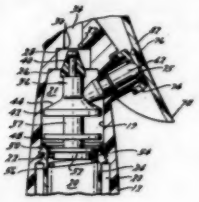
1. A tilt valve cartridge for a pneumatic mechanism comprising:
a cylindrical housing having a central passageway connecting a first open end and a second open end, said first open end having a smaller diameter than that of said second open end, said first and second ends having means for retaining interior parts within said cartridge;
valve seat in the passageway at the first open end of the housing;
valve member in tiltable contact with the valve seat;
valve stem extending from the valve member and protruding from the first open end;
means for biasing the valve member to a closed position; and
means for sealing said cartridge in said mechanism.

4,927,115

VALVE FOR A HAND HELD SPRAY NOZZLE

Gobind Bahroos, Riverview, Mich., and Patrick B. Jonte, Indianapolis, Id., assignors to Masco Corporation of Indiana, Taylor, Mich.

Filed May 26, 1989, Ser. No. 358,309
Int. Cl.[5] F16K *31/44*
U.S. Cl. 251—241 **13 Claims**



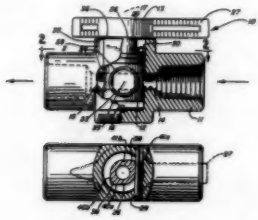
1. A valve characterized by:
a housing having an upstream end constructed to be secured to a flexible hose and a downstream end having a fluid outlet and a valve seat;
a movable valve element axially movable along an axis between an open and closed position;
a push rod canted with respect to said axis;
an annular frusto-conical camming member affixed upstream of and to said valve element for abutting said push rod;
a handle means for axially moving said push rod against said camming means for axially moving said valve element upstream to said open position; and
biasing means for biasing said valve element to said closed position.

4,927,116

PLUG VALVE

Albert J. Schwarz, Lincolnwood, and Anthony M. Pietramale, Schaumburg, both of Ill., assignors to The Pullman Company, Princeton, N.J.

Filed Oct. 31, 1988, Ser. No. 264,996
Int. Cl.[5] F16K *5/04*
U.S. Cl. 251—312 **11 Claims**



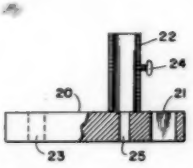
1. A plug valve comprising:
a body defining a cylindrical flow chamber recess defining an axis and opening axially outwardly through an opening in a first portion of the body, an inlet port opening through a second portion thereof to said recess transversely to the axis of the recess, an outlet port opening through a third portion thereof from said recess transversely to the axis of the recess;
a straight-walled cylindrical flow control plug coaxially rotatably received in said recess through said outwardly axial opening, and defining a through bore extending axially transversely to the axis of rotation of the plug in the recess providing a flow passage through the plug from said inlet port to said outlet port in an open arrangement of the valve;
a stem projecting from said plug outwardly through said first body portion opening;
a manipulating handle connected to said stem outwardly of said first body portion opening;
a single member retaining element extending through said first body portion and across said opening laterally adjacent said stem and axially between said handle and said plug for securely retaining said plug rotatably in said recess and for accurately locating the plug and body ports for assuring full flow;
means for sealing the plug to said body including a first annular seal extending coaxially about the plug to seal the plug to the body in said recess axially inwardly of said first body portion opening, and a second annular seal carried by the plug and defining an axis intersecting the axis of said through bore for sealing engagement with the body about said inlet port in a closed arrangement of the valve;
stop means rotatable with said plug for selectively engaging said retaining element for accurately and precisely limiting the rotation of the plug about the axis thereof, thereby precisely controlling the open and close positions of the valve.

4,927,117

RIDING TRACTOR UMBRELLA

Michael D. Gainey, 100 Beth Dr., Darlington, S.C. 29532

Filed Nov. 17, 1988, Ser. No. 272,346
Int. Cl.[5] B60R *11/00*
U.S. Cl. 248—539 **9 Claims**



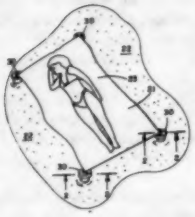
1. A riding tractor suitable for cutting grass having a means to shelter the operator from the sun attached thereto comprising a riding tractor having at least one accessory implement attaching aperture on a rear portion thereof to attach accessory implements thereto, a plate having at least one aperture therethrough to align with the accessory implement attaching aperture on the rear portion of said riding tractor, means to attach said plate to the at least one accessory implement attaching aperture on a rear portion of the riding tractor, a shelter means to shelter said operator from the sun, means to attach to said plate said means to shelter said operator, and aperture means in said plate to attach an accessory implement to said plate.

4,927,118

BEACH ACCESSORY DEVICE

Donato A. Pierorazio, 124 Riverside Rd., Baltimore, Md. 21221

Filed Aug. 8, 1988, Ser. No. 229,324
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—545 **30 Claims**



1. In combination with a towel or the like intended for use on the beach, wherein wind currents normally whip the towel around and prevent the towel from lying smoothly on the beach, the beach towel having a plurality of corners, a plurality of devices associated with the corners of the towel for retaining the towel on the beach, each of the devices comprising a hollow main body portion having an open top, so that sand is poured through the open top into the main body portion, thereby substantially increasing the weight of the device, the device further comprising a stem portion formed integrally with the main body portion such that an intersection is formed therebetween, the stem portion depending therefrom, and adapted to be pressed into the beach, such that the device is buried in the beach to a depth substantially to the intersection between the main body portion and the stem portion of the device, a lid removably engaging the open top of the main body portion of the device, and means for retaining the corner of the beach towel or the like by the device.

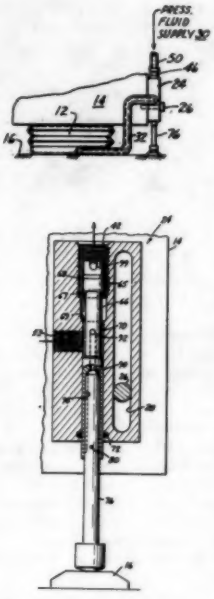
4,927,119

REVERSIBLE FLOW VALVE FOR AIR ISOLATED BASES

Charles Frost, La Verne, Calif., assignor to Kimball Industries, Inc., Monrovia, Calif.

Continuation of Ser. No. 832,848, Feb. 24, 1986, abandoned.
This application Oct. 31, 1988, Ser. No. 264,687
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—550 **17 Claims**

17. In combination: A self-adjusting valve and a fluid pressure system comprising a fluid inflatable means, said valve comprising an axially extended valve body movably positioned above a surface, said valve body having first and second ports at selectively different fluid pressures and a valve body passage therebetween, said second port being adapted for open communication with said fluid inflatable means, said fluid inflatable means being desirably kept at a predetermined level of inflation, an axially extended valve stem bodily shiftable within said passage, and cooperating means defined by said passage and said stem for controlling fluid flow to and from said inflatable means, said valve stem having a rigid axial extension beyond said valve body adapted to contact or not contact said surface responsive to greater or lesser inflation of said fluid inflatable



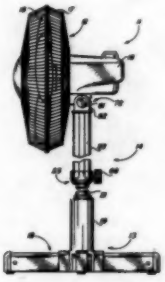
means to shift said valve stem axially to adjust fluid flow to achieve said predetermined level of inflation.

4,927,120

PORTABLE ELECTRICAL FAN

Jui-Shang Wang, Taipei, Taiwan, assignor to Duracraft Corporation, Sudbury, Mass.

Filed Aug. 9, 1989, Ser. No. 391,261
Int. Cl.[5] F16M *3/00*
U.S. Cl. 248—676 **20 Claims**



1. A portable electric appliance comprising:
standard means;
fan means supported by one end of said standard means and comprising a rotatable blade assembly, and an electrical motor operatively coupled to said blade assembly; and
pedestal means supporting an end of said standard means opposite to said one end and comprising: a hub having a

tubular upright portion retaining said end of said standard means opposite to said one end; a base portion defining a pair downwardly facing, orthogonally intersecting first and second U-shaped retainer portions; a first elongated U-shaped channel member having an upper wall, a pair of side walls projecting downwardly from said upper wall, and a central portion retained in said first retainer portion and having a slot extending transversely through lower portions of said side walls; and a second elongated U-shaped channel member having an upper wall, a pair of side walls projecting downwardly from said upper wall, and a central portion retained in said second retainer portion and having a slot extending through its said upper wall and upper portions of its said side walls, and wherein said slot in said first channel member engages said slot in said second channel member.

4,927,121

SPRING LEAF WITH A DIMINISHING THICKNESS TOWARDS THE ENDS THEREOF AND HAVING SHOULDERS ON OPPOSITE SIDES

Alexandr N. Komarov, ulitsa Pisarzhevskogo, 7, kv. 78.; Vitaly T. Shevtsov, Topol 3, II, korpus 3, kv. 99.; Viktor E. Zema, bulvar Slavy, 44, korpus I. kv. 42.; Grigory L. Lebedik, ulitsa Pisarzhevskogo, 7, kv. 6., all of Dnepropetrovsk; Evgeny M. Zema, ulitsa Chekhova, Ib, kv. 1., Sinelnikovo Dnepropetrovskaya oblast; Vladimir A. Nedorezov, ulitsa Chekhova, Ib, kv. 2., Sinelnikovo, Dnepropetrovskaya oblast; Anatoly K. Oblovatsky, prospekt Mira, 33, kv. 10., Sinelnikiovo, Dnepropetrovskaya oblast; Boris Y. Drozdov, ulitsa Tsentralnaya, 2/4, kv. 18., Dnepropetrovsk; Andrei A. Zezjulinsky, ulitsa Geroev Stalingrada, 3I, kv. 62., Dnepropetrovsk; Sergei V. Kovalenko, prospekt Petrovskogo, 42a, kv. 38., Dnepropetrovsk; Alexandr N. Litvin, ulitsa Mira, 37, kv. 26., Sinelnikovo, Dnepropetrovskaya oblast; Vladislav P. Yatsenko, ulitsa Dnepropetrovskaya, 20., Sinelnikovo, Dnepropetrovskaya oblast, and Alexandr N. Katunin, ulitsa Mira, 36, kv. 75., Sinelnikovo, Dnepropetrovskaya oblast, all of U.S.S.R.

Filed Dec. 18, 1985, Ser. No. 810,390

Int. Cl.[5] F16F *1/18*

U.S. Cl. 267—47 **8 Claims**

1. A spring leaf comprising:

a central section having a substantially constant thickness;

a first terminal section connected at a first end of said central section and having a first free end;

said first terminal section having a thickness diminishing from said first end of said central section toward the first free end;

a second terminal section connected at a second, opposite end of said central section and having a second free end;

said second terminal section having a thickness diminishing from said second end of said central section toward the second free end; and

a plurality of upstanding shoulders on opposite sides of said spring leaf and extending at least along a portion of said opposite sides in the longitudinal direction thereof substantially to the ends of the first and second terminal sections, the height of each said shoulder diminishing from the first and second free ends towards the central section of the spring leaf.

4,927,122

VIBRATION ABSORBER

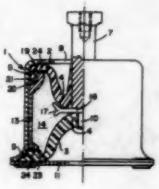
Reinhold Brumme, Wiesbaden, Fed. Rep. of Germany, and Roger Desons, Les Essarts Le Roi, France, assignors to Applied Power Inc., Milwaukee, Wis.

Filed Nov. 30, 1988, Ser. No. 277,726

Claims priority, application France, Jan. 8, 1988, 88 00158

Int. Cl.[5] F16F *13/00*

U.S. Cl. 267—140.1 **7 Claims**



1. A vibration absorptive assembly for dampening shock and vibration between first and second structural elements said assembly comprising:

a casing including: a generally cylindrical side wall, a bottom plate wall adapted to be attached to a first structural member, and a top wall, said top, said and bottom walls defining a casing chamber therein;

an aperture disposed in the top wall in axial alignment with the axis of the cylindrical side wall;

a rod member having an inner end disposed within the casing chamber and an outer end extending exteriorly of the chamber, the outer end adapted to be attached to a second structural element;

a first resiliently deformable bell-shaped membrane disposed in the casing chamber and having, inner and outer surfaces, a top bell-shaped portion axially attached to a portion of the inner end of said rod member, and an integral lower radially extending peripheral edge portion bearing against adjacent portions of the side and bottom walls;

a second resiliently deformable bell-shaped membrane disposed in the casing chamber in a position diametrically opposed to said first membrane and having inner and outer surfaces, a top bell-shaped portion axially attached to a portion of the inner end of said rod member adjacent to the outer surface of the top bell-shaped portion of said first membrane and an integral lower radially extending peripheral edge portion bearing against adjacent portions of the side and top walls;

the outer surfaces of the first and second bell-shaped membranes delimiting a hydraulic chamber;

a fluid filling said hydraulic chamber;

a sleeve member coaxially mounted within the hydraulic chamber adjacent the cylindrical side wall, said sleeve member terminating at one end with a first front face engaging the peripheral edge portion of the first membrane and a second front face engaging the peripheral edge portion of the second membrane whereby the peripheral edge portions are firmly sealed between the cylinder faces and the casing walls;

a circular washer-shaped element disposed upon the rod member between the top bell-shaped portions of the first and second membranes;

said washer-shaped member extending radially into the hydraulic chamber and terminating in a V-shaped profile;

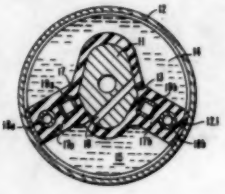
whereby dampening between said first and second structural elements is effected by relative motion of the rod and washer-shaped element with respect to the resilient membranes and the hydraulic fluid in said hydraulic chamber.

4,927,123

ELASTIC SLEEVE SPRING WITH REINFORCEMENT BODIES FOR INCREASED STIFFNESS

Hans-Werner Schwerdt, Laudenbach, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 279,663
Claims priority, application Fed. Rep. of Germany, Dec. 5, 1987, 3741260
Int. Cl.[5] F16M 5/00; F16F 13/00
U.S. Cl. 267—140.1 13 Claims



1. A hydraulically damped elastic sleeve spring comprising:
(a) an inner tube;
a window tube surrounding the inner tube at a radial spacing to form a gap therebetween, said window tube including longitudinally extending cut-outs;
(c) an outer tube surrounding the window tube;
(d) a spring body adhesively connected to the inner tube and the window tube in the gap formed therebetween wherein the spring body comprises a partition forming at least two chambers disposed behind each other with respect to the direction in which force to be damped is applied;
(e) a liquid in said chambers;
(f) at least one choke opening connecting the chambers in fluid communication;
(g) said partition comprising two sections that bridge the gap on both sides of the inner tube in a direction essentially transverse to the force application direction, at least one of said two partition sections being formed with a recess disposed at a radial distance from the inner tube and the window tube; and
(h) a reinforcement body retained in said recess to stiffen said at least one of the partition sections.

4,927,124

SPRING ASSEMBLIES

Colin E. Spedding, Wolverhampton, and Andrew Pollard, Bridgnorth, both of United Kingdom, assignors to GKN Technology Limited, West Midlands, England

PCT No. PCT/GB87/00299, § 371 Date Dec. 2, 1988, § 102(e) Date Dec. 2, 1988, PCT Pub. No. WO87/06986, PCT Pub. Date Nov. 19, 1987
PCT Filed May 7, 1987, Ser. No. 269,538
Claims priority, application United Kingdom, May 9, 1986, 8611340
Int. Cl.[5] F16F 1/36, 13/00; B60G 3/14, 15/06
U.S. Cl. 267—229 7 Claims

1. An assembly for preventing excessive deformation of a spring, the spring being in the form of a strip of fibre-reinforced plastics material of zig-zag configuration, having a plurality of limbs (10, 11, 12, 13, 14, 15, 16) connected by reflex portions (17, 18, 19, 20, 21, 22) with the longitudinal centre line of the strip lying substantially in a single plane, into a shape in which all the reflex portions are deformed equally and the limbs are all parallel to one another at a particular value of applied load and which deformed shape the spring would develop were the end limbs (10, 16) pin-jointed at their mid-points for pivotal movement about respective axes (26, 27);
the assembly including a spring as defined above; and
mounting means (23, 24) holding end ones (10, 16) of said limbs so that the spring acts resiliently therebetween and is stabilized against displacement transverse of the direction of a load applied to the spring, wherein the mounting means (23, 24) of at least one of said end limbs (10, 16)

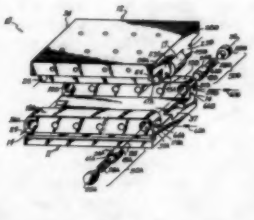
holds the respective limb at an attitude about the same as the attitude it would have at a mean value of spring load in use by having the limb pin-jointed to allow changes in attitude of the limb in use.

4,927,125

SET UP ASSEMBLY

Jerry J. Hunter, Madison, Ind., assignor to Doe Run Tooling, Inc., Madison, Ind.

Filed Apr. 4, 1989, Ser. No. 334,000
Int. Cl.[5] B23Q 1/04
U.S. Cl. 269—74 28 Claims



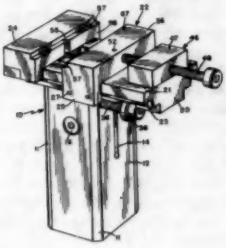
1. A set up assembly for use in holding a workpiece during a machining operation comprising:
a first member;
a second member disposed above and supported by said first member;
a roll assembly mounted to one of said members along an axis, the roll assembly having outwardly directed ends; and
engagement means mounted to the other of said members, said engagement means being selectively movable into engagement with said outwardly directed ends of said roll assembly to form a hingable connection between said first and second members, said engagement means coacting with said outwardly directed ends to form said connection in dead center position along said axis, whereby said second member may be hingedly raised above said first member about said axis, said engagement means further being selectively movable out of engagement with said roll assembly to permit removal of said second member from said first member.

4,927,126

PRECISION VISE

Frank Hoffman, 1101 Connecticut St., Imperial Beach, Calif. 92032

Filed Sep. 6, 1988, Ser. No. 240,951
Int. Cl.[5] B23Q 1/04
U.S. Cl. 269—60 17 Claims



1. A portable apparatus for holding small workpieces relative to a fixed mounting device, comprising:

an elongated post having opposed flat surfaces for releasably clamping the post at one end between the jaws of a fixed mounting device;

a rail member selectively slidably mounted at one end of the post for movement transverse to the longitudinal axis of the post;

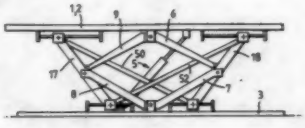
a workpiece holding assembly mounted on the upper surface of the rail member, the workpiece holding assembly having a workpiece engaging means fixedly mounted at one end of the rail member for engaging a workpiece and a selectably slidably jaw means mounted on the upper surface of the rail member for releasably holding the workpiece adjacent the workpiece holding means.

4,927,127

ADJUSTABLE SUPPORT TABLE FOR MEDICAL USE

Willem Lock, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 9, 1988, Ser. No. 230,286
Claims priority, application United Kingdom, Aug. 12, 1987, 8719133
Int. Cl.[5] A61G 13/00
U.S. Cl. 269—322 18 Claims



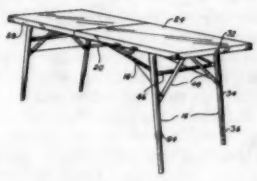
1. A table for supporting a patient comprising, a carrier member including a support table top, a base member below said carrier member, a linkage assembly means connecting the carrier member to the base member for maintaining the table top substantially horizontal while permitting a relative vertical displacement to occur between the carrier member and the base member, and adjustment means for effecting a said relative vertical displacement between the carrier member and the base member, wherein the linkage assembly means comprises a rhombus shaped assembly of four linked struts pivotally joined end to end to one another by a series of pivotal joints including an upper pivotal joint pivotally mounted on the carrier member, a lower pivotal joint pivotally mounted on the base member, and first and second intermediate pivotal joints on opposite sides of said rhombus shaped assembly, said series of pivotal joints having pivot axes parallel to each other, first and second support struts on opposite sides of said rhombus shaped assembly and each having an upper and a lower end and a mid point between said upper and lower ends, first upper and first lower horizontally displaceable bearing means respectively pivotally connecting the upper and lower ends of the first support strut to the carrier member and the base member, second upper and second lower horizontally displaceable bearing means respectively pivotally connecting the upper and lower ends of the second support strut to the carrier member and the base member, said first and second, upper and lower, horizontally displaceable bearing means having pivot axes parallel to the pivot axes of said series of pivotal joints, the mid points of the first and second support struts being respectively pivotally attached to the first and second intermediate pivotal joints, and first and second substantially inextensible supporting linkages of equal effective length, each said supporting linkage having an upper and a lower end, said first supporting linkage being pivotally attached at its upper and lower ends respectively coaxially with the pivot axes of the first upper and second lower horizontally displaceable bearing means and said second supporting linkage being pivotally attached at its upper and lower ends respectively coaxially with the pivot axes of the second upper and first lower horizontally displaceable bearing means.

4,927,128

SLIDING LEG BODYWORK TABLE

Lynwood O'Brian, 5381 Old San Jose Rd., Soquel, Calif. 95073

Filed Sep. 8, 1989, Ser. No. 404,852
Int. Cl.[5] A61G 13/00
U.S. Cl. 269—322 10 Claims



1. A folding portable table for use in massage and other therapeutic applications, comprising:

a rectangular table top comprised of a pair of abutting rectangular table top sections hingedly connected to one another,

a perimeter frame integral with each of said table top sections,

four channels, each channel being secured inside of said perimeter frame and in a corner position thereof, said channels being elongate and adapted to slidably receive and secure a table leg therein,

two sets of paired tubular legs, each set connected together by a leg set top tube and a lower connecting cross tube being essentially parallel to said table top so that each pair of legs is secured to a underside of a table top section, each leg comprising an upper and a lower portion, said lower portion being of slightly smaller dimension than said upper portion to permit a telescoping movement by the lower portion.

means for securing said lower leg portion and said upper leg portion together,

two sets of paired diagonal braces each secured at one end to the underside o a table top section substantially at a central position and at the other end each diagonal brace is rotably connected to said leg set connecting cross tube forming a triangular configuration between the support legs, the diagonal braces, and the table top, and

four wire rope cables each attached at one end to said leg set top tube near each channel and at the other end to a brace,

each cable being under tension when said table top sections are in an open configuration.

4,927,129

APPARATUS FOR STORING PARTIALLY OVERLAPPING PAPER SHEETS

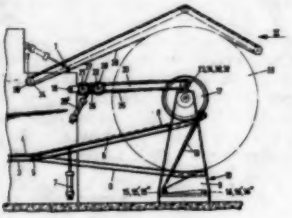
Peter Merkli, Oftringen, Switzerland, assignor to Grapha-Holding AG, Hergiswil, Switzerland

Filed Nov. 16, 1988, Ser. No. 272,119

Claims priority, application Switzerland, Nov. 19, 1987, 04503/87

Int. Cl.[5] B65H *39/08*; B65B *63/04*

U.S. Cl. 270—60 13 Claims



1. Apparatus for converting a succession of sheets into a roll of convoluted sheets, comprising a frame; first and second cores rotatably mounted in said frame; a plurality of elastic bands convoluted onto said second core and onto each other and having end portions connected to said first core, said bands including a shorter band and a longer band; and guide means provided in said frame for moving the bands apart intermediate said cores so that when the first core is rotated to collect said bands, the bands are convoluted onto discrete portions of said first core, said guide means including means for stretching said shorter band to a greater first extent and for stretching the longer band to a lesser second extent so that the difference in the stretching of said shorter and longer bands exceeds the difference in lengths of said shorter and longer bands.

4,927,130

AUTOMATIC SHEET FEEDER

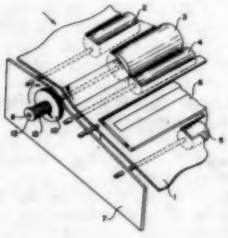
Hironori Tanaka, Yamatokoriyama; Matshira Kotani, and Masafumi Matsumoto, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 6, 1988, Ser. No. 241,372

Claims priority, application Japan, Sep. 7, 1987, 62-224790

Int. Cl.[5] B65H *5/06*

U.S. Cl. 271—10 5 Claims



1. An automatic sheet feeder comprising:

a feed roller for feeding sheets one by one to a sheet conveying path;

a feed roller shaft for supporting the feed roller;

a conveyor roller provided downstream of said feed roller on the sheet conveying path, said conveyor roller conveys sheets fed by the feed roller to an image reading unit at a first speed;

a feed roller gear supported on said feed roller shaft for rotating said feed roller at a second speed, said first speed being greater than said second speed;

clutch means for connecting said feed roller gear to the feed roller shaft to rotate said feed roller at the second speed until a leading edge of a sheet being fed by said feed roller arrives at a nipping line of the conveyor roller whereafter said feed roller is uncoupled from the feed roller gear and is rotated at the first speed by movement of said sheet, said clutch means comprises a coupling member supported on said feed roller shaft and a spring extending between said coupling member and said feed roller gear; and

means for temporarily stopping rotation of said feed roller after the sheet has passed from the feed roller whereby spacing between successive sheets fed past said conveyor roller can be maintained, said means for temporarily stopping comprises a notched portion at an end of said feed roller shaft, said notched portion being positioned in an opening defined in said coupling member, said coupling member at the opening having a generally flat face, said notched portion having two sides, a first side of said notched portion contacting said face when said feed roller is rotated at the first speed and a second side of said notch portion contacting the face when said feed roller is rotated at the second speed, said feed roller shaft and notched portion being rotatable relative to the coupling member whereby a time period is provided when said first side of the notched portion disengages from the face and said second side of the notched portion thereafter engages the face during which time period rotation of the feed roller is stopped to thereby maintain the spacing between successive sheets.

4,927,131

SHEET STACKING APPARATUS

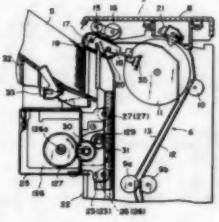
Hiroshi Hashimoto, Tokyo, and Hiromichi Yamanaka, Higashiyamato, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 81,134, Aug. 3, 1987, abandoned. This application Oct. 6, 1989, Ser. No. 418,764

Claims priority, application Japan, Aug. 4, 1986, 61-183022; Aug. 4, 1986, 61-183023; Aug. 4, 1986, 61-183161; Jan. 20, 1987, 62-012108

Int. Cl.[5] B65H *31/10*

U.S. Cl. 271—215 14 Claims



1. A sheet stacking apparatus, comprising:

a sheet discharge outlet;

sheet stacking means for receiving sheet materials discharged through said sheet discharge outlet;

means for supporting said sheet stacking means for substantially vertical movement;

driving means for moving said sheet stacking means in a substantially vertical direction;

control means for controlling said driving means to move said sheet stacking means down in the substantially vertical direction through a predetermined distance each time a predetermined amount of the sheet materials is stacked on the sheet stacking means; and

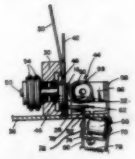
detecting means for detecting fullness of said sheet stacking means by detecting said sheet stacking means at a lower limit level which is changed in accordance with sizes of the sheet materials.

4,927,132

DOCUMENT TRANSPORT APPARATUS

Dwight G. Westover, Sierra Madre, Calif., assignor to TransTechnology Corporation, Sherman Oaks, Calif.

Filed Jul. 28, 1988, Ser. No. 225,232
Int. Cl.[5] B65H 5/06
U.S. Cl. 271—225 **37 Claims**



1. Apparatus for registering and advancing a document along a track, comprising in combination:

document receiving means including said track having a registration surface for supporting said document along said document's bottom edge;

a plurality of rotatable disks having respective planar surfaces in side-by-side spaced relation along said track;

means for rotating said disks and said disk surfaces;

a plurality of first members, each actuable between an active position and an inactive position and having actuation means therefor, said first members when in their active positions urge said document received by said document receiving means against respectively associated ones of said rotating disk surfaces when said document is interposed therebetween for causing said document to advance toward and register its bottom edge against said registration surface;

a plurality of second members, each actuable between an active position and an inactive position and having actuation means therefor, said second members when in their active positions urge said received document against respectively associated ones of said rotating disk surfaces when said document is interposed therebetween for causing said document to advance along said track; and

control means for controlling actuation of said first and second members to said active and inactive positions respectively, and alternatively to said inactive and active positions respectively.

4,927,133

ANGLED CONVEYOR FOR DOCUMENT PACKAGES

David W. Evans, Alpha, N.J., assignor to Bell & Howell Company, Skokie, Ill.

Filed Sep. 23, 1988, Ser. No. 248,458
Int. Cl.[5] B65H 5/02
U.S. Cl. 271—225 **10 Claims**

1. A mailing machine including an angled conveyor device for document packages comprising:

first feed means for in-feeding of said document packages in seriatim;

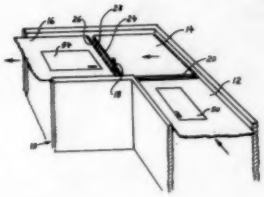
a transition conveyor belt including a downstream transition end;

an output conveyor belt for seriatim outfeeding of said document packages, said output conveyor belt including an upstream output end;

a frame on which said belts are driveably mounted;

a transition gap disposed between said downstream transition end and said upstream output end;

turn post means extending substantially vertically upwardly through said transition gap and protruding above the upper surfaces of said transition and output conveyor belts, said turn post means serving to intercept and guide said document packages therearound so that said document packages become substantially aligned angularly and transversely on said output conveyor belt;



said transition conveyor belt having an angled direction of motion relative to the direction of motion of said document packages during in-feeding; and,

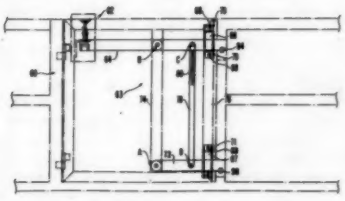
said output conveyor belt having a direction of motion generally in line with the direction of motion of said transition conveyor belt.

4,927,134

DASHER BOARD SYSTEM

John S. Burley, Salix, Pa., assignor to Burley's Ring Supply, Salix, Pa.

Division of Ser. No. 214,433, Jul. 1, 1988, Pat. No. 4,883,267.
This application Aug. 17, 1989, Ser. No. 395,361
Int. Cl.[5] E04H 17/16
U.S. Cl. 272—3 **5 Claims**



1. A dasher board system for an ice rink comprising:

frame segments coupled to form a continuous framework around said ice rink;

facing panels attached to said framework;

a door opening formed between two adjacent frame segments to accommodate a hinged door, said door having a latch mechanism including:

a push-button lock means for releasing said latch mechanism, said lock means being flush with an upper edge of said door when in its non-actuated position and actuatable from either inside or outside of said ice rink;

a lever arm arrangement pivotally coupled to form a parallelogram configuration; and

a hook means for receiving at least one arm of said lever arm arrangement when said door is closed, so that upon actuation of said lock means, said lever arm arrangement pivots to release said at least one arm from said hook means.

4,927,135

EXERCISE APPARATUS

Heikki Nieppola, Rusinniementie 17, SF-35800 Mänttä , Finland

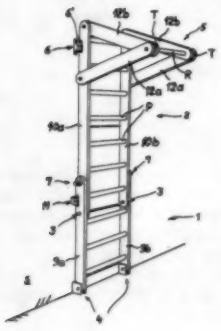
PCT No. PCT/FI87/00178, § 371 Date Sep. 2, 1988, § 102(e) Date Sep. 2, 1988, PCT Pub. No. WO88/04943, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 29, 1987, Ser. No. 246,397

Claims priority, application Finland, Jan. 5, 1987, 870017

Int. Cl.[5] A63B *17/00*

U.S. Cl. 272—63 6 Claims



1. Exercise apparatus for use mounted at a wall, said apparatus comprising:

upper and lower elongated members, each of said elongated members comprising a pair of spaced-apart longitudinal stringers and means holding said stringers in a spaced-apart parallel arrangement, each of said members having upper and lower end portions;

means affixed at the lower end of said lower member for pivotally securing said lower member at the base of said wall;

pivot means connecting the lower end portion of said upper member in an overlapping relationship with the upper end portion of said lower member for pivoting movement between a position in which both elongated members are in the same plane, and a position in which said elongated members are at an angle with respect to each other;

locking means for locking said elongated members in the same plane in an upright position, and for securing said upper elongated member in a horizontal or an inclined position, said locking means comprising pins mounted at the upper ends of said stringers of said lower elongated member and corresponding holes in the lower end portion of said upper elongated member for engaging said pins; and

a support pedestal fixedly mounted on the upper end of said upper elongated member for supporting said upper end of said upper elongated member.

4,927,136

BRAKING SYSTEM FOR EXERCISE APPARATUS

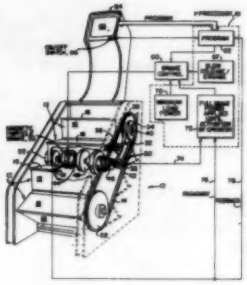
John W. Leask, Carlisle, Mass., assignor to Engineering Dynamics Corporation, Lowell, Mass.

Filed Jan. 6, 1989, Ser. No. 294,478

Int. Cl.[5] A63B *23/06*

U.S. Cl. 272—69 13 Claims

1. In combination with escalator type exercise apparatus including an inclined and hinged set of stairs, means for guiding movement of said stair down an incline, and means coupled to said stairs for limiting the movement thereof in a downward direction when an individual is standing on one of said stairs, said limiting means including electromagnetic braking means for controlling the movement of said stairs down said incline, said electromagnetic braking means including a shaft con-



nected to said stairs, means for substantially locking said shaft and means actuatable by said individual for deactivating said locking means.

4,927,137

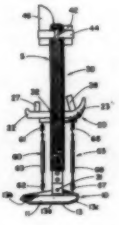
STILT

Charles R. Speer, 14014 Briar Pl., Houston, Tex. 77077

Filed Jul. 11, 1988, Ser. No. 217,157

Int. Cl.[5] A63B *25/00*

U.S. Cl. 272—70.1 18 Claims



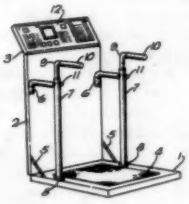
1. A stilt to be used in pairs for elevating the user thereof comprising: ground or floor engaging means, elongated support means attached to said ground engaging means, said support means including means for attachment to the user's leg, and a foot support assembly attached to said support means for supporting a foot of said user at a vertically elevated position from said ground engaging in which each of said ground engaging means and said foot assembly is attached to said support means by single pivot connections, one pivot connection for each, the single pivot connection for said foot assembly supporting the load on said foot assembly and the single pivot connection for said ground engaging means supporting the load on said ground engaging means, and biasing means connecting said ground engaging means and said foot support assembly tending to bias said ground engaging means and said foot support assembly toward mutually parallel positions.

4,927,138

EXERCISE APPARATUS

Carlo V. G. Ferrari, 51 Hyde Crescent, Hendon, London N.W.9., England

Filed Jul. 1, 1988, Ser. No. 214,474
Claims priority, application United Kingdom, Jan. 26, 1988, 8801701
Int. Cl.[5] A63B *1/00, 3/00*
U.S. Cl. 272—70 4 Claims



1. A portable exercise apparatus comprising:
a base member having a force plate thereon for receiving the force of a user standing and running in place on the force plate, the base member having a rear edge and opposite side edges;
an upstanding member hingedly connected to the rear edge of the base member, the upstanding member having a top edge and opposite side edges;
a display panel member hingedly connected to the top edge of the upstanding member;
a pair of first sockets connected to the upstanding member adjacent respective opposite side edges thereof;
a pair of second sockets connected to the base member adjacent respective opposite side edges thereof;
a first angled support having a lower end engageable into one of the second sockets, the first angled support having an upper end with a portion pivotally mounted in one of the first sockets;
a second angled support having a lower end engaged into the other of the second sockets, the second angled support having an upper end with a portion pivotally mounted in the other of the first sockets;
a pair of angle members, each angle member telescopically engaged into the upper end of one of the first and second angled supports, each angle member having a hand grip to be held by the user for conducting isometric, isotonic and running in place exercises on the force plate; and
bracket means connected between the base member and the upstanding member for holding the upstanding member in an upstanding relationship to the base member, the lower ends of the angled supports being disengageable from the second sockets for pivoting the angled supports toward each other in the first sockets and against the upstanding member, and the base member and display panel member being pivotable against the upstanding member and over the folded angled supports for storage of the apparatus.

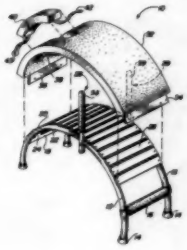
4,927,139

THERAPEUTIC BACK REST

Abraham K. Taltre, 1011 E. Ginter Rd., Tucson, Ariz. 85706

Filed Jun. 2, 1989, Ser. No. 360,859
Int. Cl.[5] A63B *23/00*
U.S. Cl. 272—144 10 Claims

1. A therapeutic back rest for placing a person's back, neck, and pelvis in a continuous curve when reclining comprising:
a pair of parallel, spaced apart semi-circular supports having first and second ends adapted to rest on the ground, said semi-circular supports having a radius sufficiently great than the arc defined by said supports is of such a length that a fully extended user may recline along said back rest with no part of the person touching the ground;
a foot cross bar connecting said semi-circular supports proximate said first end of said semi-circular supports;
a second cross bar connecting said semi-circular supports proximate said second end of said semi-circular supports;
a plurality of spaced apart slats operably attached to said semi-circular supports, said slats forming an arch adapted to receive the body of the reclining person and defining



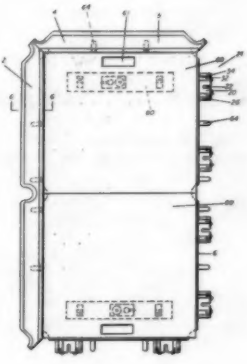
the arc that the person's back, neck, and pelvis is to conform to; and
a third cross bar proximate said second cross bar, and a pair of spaced apart structural members, said second and third cross bars and said pair of structural members defining a rectangle, said rectangle adapted to receive and hold the person's head when the person is reclining on said back rest whereby the person's neck continues to conform to the curve of the person's back.

4,927,140

CONVERTIBLE BILLIARD TABLE

Spilios A. Pappas, 4233-24th St., San Francisco, Calif. 94114

Filed Jul. 21, 1989, Ser. No. 383,016
Int. Cl.[5] A63D *15/04*
U.S. Cl. 273—4 R 14 Claims



1. A game table including:
a rectilinear bed having four edges bounding an upper playing surface;
curvilinear bed notches in the four corners of the bed and in the center of two opposing edges; and
four rails moveable from a first to a second position, each position having one rail adjacent and parallel to each edge, the rails having

opposing and parallel first and second long sides each, and
generally curvilinear rail notches at the ends of the rails on the first side and in the center of two of the rails on the first side,
wherein
pockets are formed by the bed notches and adjacent rail notches when the rails are in the first position with the first sides facing the playing surface
and wherein
no pockets are formed when the rails are in the second position with the second sides facing the playing surface.

4,927,141

NOVELTY BALL

Arlen C. Paranto, P.O. Box 304, Eatonville, Wash. 98328

Filed Jul. 24, 1989, Ser. No. 383,607
Int. Cl.[5] A63B 37/14, 43/02
U.S. Cl. 273—58 K 10 Claims

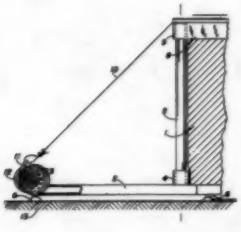
1. A novelty ball useful for the development of motor skills and for other purposes which comprises:
a long, generally spherical ball formed of a soft, compressible, resilient material; and
a multiplicity of flexible whisker means having one end anchored within and protruding from the ball generally along radii thereof, said whiskers having at least some drape when the ball is at rest but not so much drape so that they hang limply from the ball.

4,927,142

SUPPORTING DEVICE FOR NET POSTS IN TENNIS COURTS

Norbert Drusel, Im Schlah 12, 2862 Worpswede, Fed. Rep. of Germany

Filed Jan. 6, 1989, Ser. No. 295,110
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1988, 3802655
Int. Cl.[5] A63B 61/02
U.S. Cl. 273—29 BB 7 Claims



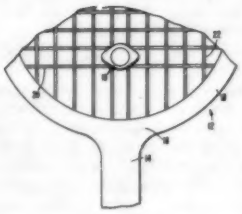
1. A supporting device for supporting a tennis net on a tennis court, comprising:
A tennis net and a pair of vertically extending tennis net support posts said net being attached between said support posts by a net support means;
A horizontally extending lever having first and second ends and top and bottom surfaces, mounting means adjacent said first end and on said top surface mounting a lower end of at least one of said support post to said lever; an elongate, cylindrical weight means attached to said second end of the top surface of said lever, said weight means extending substantially perpendicular to a longitudinal recess of said lever and eccentrically mounted roller means disposed at each end of said cylindrical weight for rotation about an axis, said axis being offset from a longitudinal axis of said weight means, a net tension line attachment means attached intermediate the ends of said weight means for attachment at least one of said support post, a net tension line extending from said tension line attachment means to the top of said at least one of said support post for holding said tennis net support means in a taunt condition, and an elastic support means on said bottom of said lever.

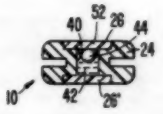
4,927,143

FLUID VIBRATION DAMPER FOR RACQUET

Bart A. Hillock, 5560 Pembroke, Santa Barbara, Calif. 93111

Continuation of Ser. No. 911,005, Sep. 24, 1986, abandoned. This application Jul. 22, 1988, Ser. No. 222,282
Int. Cl.[5] A63B 51/10
U.S. Cl. 273—73 D 14 Claims

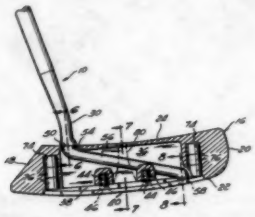




7. In combination with a sports racquet having a plurality of crossing strings, a handle, a throat connected to said handle, and a bow connected to said throat and adapted for mounting said strings, a damping device, comprising:
a body having a pair of end faces each having a greatest longitudinal dimension and a greatest lateral dimension, said body further having a peripheral wall extending between said end faces and defining a thickness of said body, said greatest longitudinal dimension being greater than said greatest lateral dimension so that the body has a generally oblong shape, both said longitudinal dimension and said lateral dimension being greater than the distance between adjacent strings on said sports racquet, a peripheral groove dimensioned to receive the strings of said sports racquet, said peripheral groove being formed in said peripheral wall such that the peripheral groove has a maximum depth which is not uniform, the depth of the peripheral groove being greater in said longitudinal dimension than said lateral dimension, and further wherein said damping device is mounted in said strings such that said groove receives strings to entrap said damping device among said strings so that the body overlaps the strings to

a greater extent in the longitudinal dimension of the body than in the lateral dimension.

4,927,144
PUTTER
Robert D. Stormon, 2103 Divot La., Palm Springs, Calif. 92264
Filed Aug. 7, 1989, Ser. No. 390,082
Int. Cl.[5] A63B *53/02, 53/08*
U.S. Cl. 273—80 A 8 Claims



1. The improvement in a golf putter having an elongated shaft with a grip at its upper end and having a club head with a heel end, a toe end, a sole, an upper surface, and a face comprising:

(a) said club head having a downwardly open cavity elongated in a heel-to-toe direction and having a plate closing said cavity at said sole of said club head and secured to said club head,

(b) said club head having a generally vertically extending top opening to said cavity in said heel end of said club head and said plate having a generally vertically extending through opening in said toe end thereof,

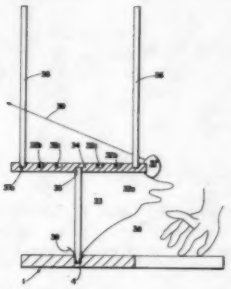
(c) said shaft having an extension at its lower end below the main portion of said shaft including a first portion bent to pass downwardly through said top opening, having a second portion slanting downwardly in said cavity toward said toe end, and having a third portion extending downwardly into said through opening in said plate where it is welded to said plate,

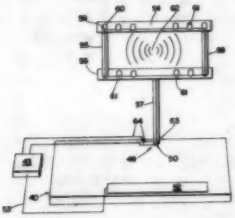
(d) said shaft at its location passing through said top opening being smaller in cross-section than said top opening whereby when a golf ball is struck by said face said first portion of said shaft has room in said top opening to flex relative to said club head whereby said head gives upon initial impact with said golf ball and then recoils against said golf ball,

(e) said club head having a center of gravity located at the intersection of the longitudinal axis of said second portion of said shaft and of a diagonal line bisecting the angle formed by a line from said grip to said through opening and by the centerline of said main portion of said shaft, said extension including a first reduced diameter portion above and adjacent to said top opening of said club head and said third portion of said extension being equally reduced in diameter and said reduced diameter portions being substantially equally spaced from said center of gravity whereby torquing of said shaft upon impact with a golf ball is equally shared by said reduced diameter portions, and

(f) half the weight of said club head being disposed above and half the weight of said club head being disposed below an oblique plane that extends through said longitudinal axis of said second portion of said shaft extension, said oblique plane forming straight horizontal lines in vertical planes at right angles to said longitudinal axis of said second portion of said shaft extension, whereby during generally horizontal travel of said club head during a stroke, said club head does not tend to rotate about said longitudinal axis of said second portion of said shaft extension.

4,927,145
BOARD GAME APPARATUS
George M. Davis, 1826 Escambia Ave., Pensacola, Fla. 32503
Filed Oct. 11, 1988, Ser. No. 255,488
Int. Cl.[5] A63F *7/06*; A63B *63/00*
U.S. Cl. 273—94 10 Claims





4. A board game apparatus comprising:

a planar playing board having line graphics and alphanumeric graphics printed thereon;

a flat disc shaped object adapted to be propelled by the manual thumping method across said playing board;

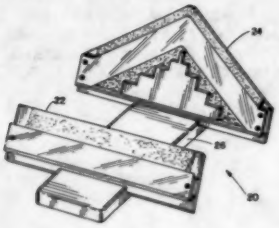
said line and alphanumeric graphics comprising indicia means for determining the outcome of a play by a player propelling said disc by the manual thumping method in accordance with predetermined game rules;

the surface of said playing board having suitable surface unevenness to impede the formation of a vacuum between said disc and surface while said disc is being propelled across said surface;

a plurality of distributed conductor means associated with said laying board for generating signals relating to the position of said disc relative to said playing board, said disc having appropriate characteristics to interact cooperatively with said conductor means to generate said signals; and

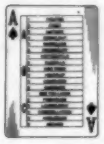
auxiliary game apparatus adapted to be used in combination with said playing board and disc during play, including a removably mountable goal apparatus adapted to be mounted in a receptacle formed in said playing board, said goal apparatus comprising a central post member, a crossbar member connected to said central post member, and two upright members removably mountable on said crossbar member.

4,927,146
PLAYING CARD HOLDER
Arthur E. Bull, 48 Laurel, Mt. Dora, Fla. 32757
Filed Nov. 14, 1988, Ser. No. 270,951
Int. Cl.[5] A63F 1/10
U.S. Cl. 273—150 19 Claims



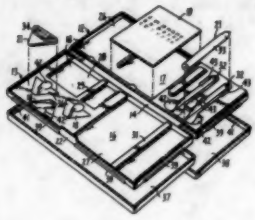
1. A holder for playing cards, comprising:
a backing plate;
a transparent view plate fixed to said backing plate, said view plate being substantially parallel to and spaced apart from said backing plate to define a card-holding slot therebetween; and
means for urging a playing card inserted in said card-holding slot against said view plate, said urging means including a plurality of deformable carpet pile filaments fixed to said backing plate and extending across said card-holding slot into abutment with said view plate, said filaments deflecting when a playing card is inserted in said card-holding slot and holding the inserted card against said view plate.

4,927,147
CHARADE AND DRAWING CARD GAME USING DICE
Robert J. Delzio, P.O. Box 20251, San Deigo, Calif. 92120
Filed Apr. 11, 1988, Ser. No. 180,146
Int. Cl.[5] A63F 1/04, 9/04
U.S. Cl. 273—146 2 Claims



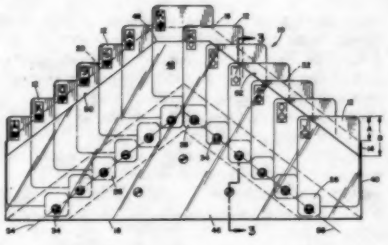
1. A charade and drawing card game consisting of a supply of cards each bearing eighteen words or phrases categorized into three letter groups, A, B, and C, of six words or phrases each, numbered 1 through 6, utilizing three distinct six-sided dice, the Letter Die (two sides "A", two sides "B", two sides "C"), the Number Die (numbered 1 through 6), and the Charade/Draw Die (three sides "Charade", three sides "Draw"), which when tossed simultaneously, these dice serve to reference specific words or phrases and denote the drawing or charading of that word or phrase.

4,927,148
LOTTERY KIT
Steven L. Weiner, 5333 Blackhawk Dr., Danville, Calif. 94526
Filed Jun. 6, 1988, Ser. No. 202,950
Int. Cl.[5] A63F 9/00
U.S. Cl. 273—148 R 15 Claims



8. A kit for lottery playing paraphernalia, comprising:
first and second commensurate members each having an inner surface, an outer surface and perimeter edges, said inner and outer surfaces being contiguous to each other without space therebetween;
a protective cover member sized to fit a chosen one of said first and second members in covering relation thereto;
interengaging snap means, provided on the chosen member and on said protective cover member, for releasably holding the protective cover member in place on the chosen member;
said members being hingedly joined to each other along a perimeter edge such that in a closed position said members lie inner surface to inner surface thereby forming a clamshell folio case, and in an open position said members lie substantially coplanar;
an inner face of at least one member including at least one indentation sized to receive at least one piece of paper used in lottery playing; and
a latch located on said first member for releasably retaining the second member when the clamshell folio case is in the closed position.

4,927,149
PLAYING CARD HOLDER
Arthur E. Bull, 48 Laurel, Mt. Dora, Fla. 32757
Filed Dec. 21, 1988, Ser. No. 287,718
Int. Cl.[5] A63F 1/10
U.S. Cl. 273—150 19 Claims



1. A holder for playing cards, comprising:
a backing plate having a top backing plate edge; and
a plurality of pinching members mounted on said backing plate in a preselected arrangement, each of said pinching members including a pinch block having a fixed end connected to said backing plate and a free end extending from said fixed end toward said top backing plate edge, said free

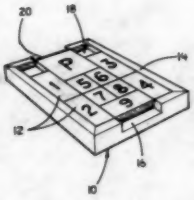
end of each of said pinch blocks including a card-gripping surface facing said backing plate, each of said pinching members also including a spacer disposed between said respective pinch block and said backing plate to define a clearance space between said card-gripping surface of said respective pinch block and said backing plate, each of said clearance spaces having a width less than the thickness of a playing card so that a playing card inserted in any of said clearance spaces is fictionally gripped between said backing plate and said card-gripping surface of said respective pinch block.

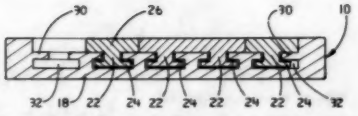
4,927,150

SHIFTABLE BLOCK PUZZLE

Terry Monoyios, 323 Alten, N.E., Grand Rapids, Mich. 49503

Filed May 11, 1988, Ser. No. 192,843
Int. Cl.[5] A63F 9/08
U.S. Cl. 273—153 S **2 Claims**





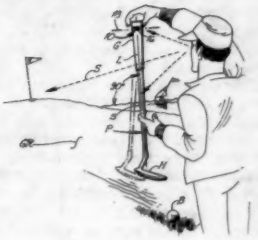
1. In a sliding block puzzle comprising a playing surface including formed channels therein surrounded by a rectangular frame, a plurality of rectangular playing pieces slidably positioned on the playing surface, said playing pieces including depending projections that fit into said channels, the projections further including extending portions below the playing surface that compatibly prevent the pieces from being vertically removed from the playing surface while allowing for slidable movement of the playing pieces through said channels in the playing surface, the size of the playing pieces being such that the pieces are positioned contiguously and fill the frame, with the exception that there is at least one vacant space inside the frame such that the playing pieces are slidable in perpendicular directions inside the frame and into the vacant spaces to change relative positions of the pieces on the playing surface, the improvement wherein an object piece is also slidably positioned on the playing surface, said object piece not having a depending projection and therefore being free to be removed from the playing surface, and further where the frame includes at least one opening therein at a predetermined location, the object piece being slidable through the opening allowing the exit of the object piece from the playing surface when the object piece is slidably manipulated to a position on the playing surface adjacent the opening.

4,927,151

GOLF CLUB INCLUDING SIGHT LEVEL INDICATOR

Albert J. Ronnick, 1928 S. Orange Ave., Sarasota, Fla. 34239

Filed Jul. 28, 1989, Ser. No. 387,000
Int. Cl.[5] A63B 69/36, 53/00
U.S. Cl. 273—162 B **4 Claims**



1. A golf club including a sight level indicator, said golf club having an elongated shaft with a head at the lower end of said shaft and a handle at the upper end of said shaft, said level indicator comprising:

a liquid-filled transparent vial having an elongated body, said liquid in sufficient quantity within said vial to form a gas bubble within said vial for viewing;

said vial structured to be connected within a mating slot or groove formed adjacent the upper end, and extending inwardly from the outer surface, of the golf club handle, said slot or groove transverse and perpendicular to the longitudinal axis of the golf club;

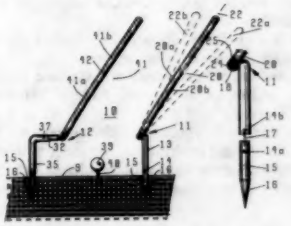
said vial generally fitting within the outer surface of the golf club handle and oriented so that said bubble may be viewed when said shaft is suspended in a generally upright orientation by the golfer for establishing the direction of offset of the fairway or putting green grade.

4,927,152

PORTABLE GOLF SWING TRAINING AID

Janice C. Graham, Rte. 4, Box 129, Miami, Okla. 74354

Filed Jul. 18, 1989, Ser. No. 381,379
Int. Cl.[5] A63B 69/36
U.S. Cl. 273—186 R **8 Claims**



1. A collapsible golf swing aid comprising:

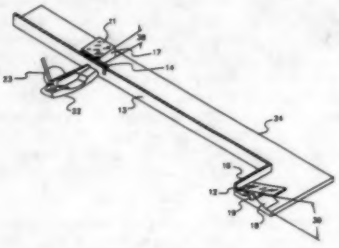
(a) a first pair of spaced members (13,13) each having one end for securing vertically to a rigid horizontal surface and a second end;

(b) first bar means (8) attaching said second ends to form an "U" shaped member;

(c) a first bar attachment means (18) rigidly attached to said first bar means and extending beyond each side of said "U" shaped member; said first bar attachment means (18) having securing means mounted into the portions (18a, 18b) thereof extending beyond said "U" shaped member;

(d) arcuate tubular means having a mating securing means in one end for inserting over said portions of said first for attachment means for securing said arcuate tubular means into a selected position;
(e) a second pair of first and second spaced members (35, 36) each having one end for securing vertically to a rigid surface and having a second end formed at right angles to said second pair of spaced members;
(f) a second "U" shaped member (32, 34, 33) adapted to rotatably attach to said second ends of said second pair of spaced members (35, 36);
(g) releasable securing means interposed between said attachment of said second "U" shaped member and said right angle ends so that when said securing means is released, said second pair of spaced members can be rotated to a substantially compact configuration;
(h) a second bar attachment means (26) rigidly secured to said second "U" shaped member and having an extension on each side beyond said second "U" shaped member, each extension having securing means therein; and
(i) a second arcuately shaped tubular means having mating securing means on each end for attachment to one of said securing means on said second bar attachment means.

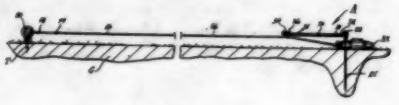
4,927,153
GOLF PUTTING PRACTICE DEVICE
John P. Schaefer, 2533 Pepperidge Dr., Garland, Tex. 75044
Filed Feb. 13, 1989, Ser. No. 309,373
Int. Cl.[5] A63B 69/36
U.S. Cl. 273—187 R **14 Claims**



1. A device for assisting a golfer during practice putting, comprising;
(a) a base member having first and second mirrors mounted thereon;
(b) said first mirror positioned directly in front of the golfer where the stance is to be taken;
(c) said second mirror positioned on base extension to the right, or left, of golfer and directly behind the proper location of the golf ball;
(d) both mirrors having a directional slant toward the golfer's proper head position, so that the golfer will be able to see his eyes reflected in both mirrors when his head is properly aligned directly above the golf ball.

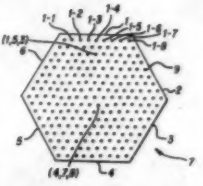
4,927,154
GOLF PRACTICE DEVICE
Ralph C. Boyer, 1507 Missouri Ave., Crystal City, Mo. 63019, and Edward C. Macauley, 1455 Reauville, St. Louis, Mo. 63122
Filed Jul. 17, 1989, Ser. No. 380,603
Int. Cl.[5] A63B 69/36
U.S. Cl. 273—200 R **6 Claims**

1. A device for the practice of golf strokes comprising a golf ball, a non-elastic elongated member of preselectable length having opposite ends, an elastic segment, reel means and anchor means; said non-elastic member comprising a tether cord and being securely attached at one end to said golf ball and at the other end to said reel means; said elastic segment being attached by one of its ends to a point along said tether cord and at its other end to said anchor means for prevention of transfer of shock to the reel means when said golf ball reaches the outermost point of its trajectory and for facilitating return of said ball; said tether cord having an integral component de-



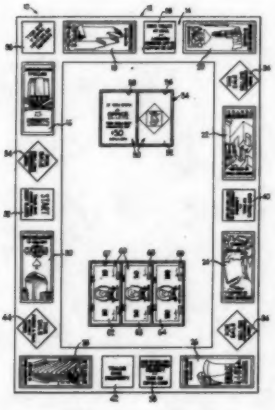
fined by its attachment at one end to said reel means and at its other end by the point of attachment of said elastic segment for checking the flight of the golf ball; the preselected length of said tether cord between said golf ball and said reel means defining the maximum length of the trajectory of the golf ball; said anchor means comprising a post-forming element for anchoring said device throughout use thereof.

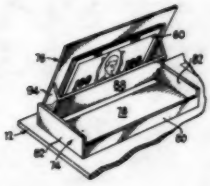
4,927,155
BOARD GAME
Jeffrey N. Bellinger, 56 Frances Dr., Clark, N.J. 07066
Filed Apr. 19, 1989, Ser. No. 340,285
Int. Cl.[5] A63F 3/00
U.S. Cl. 273—255 **5 Claims**



1. A board game comprising:
(a) a board having a multiplicity of spaces formed over the entirety of a surface thereof;
(b) a plurality of game pieces placeable on said board in random fashion, said pieces including:
(i) a plurality of birds for each player, each said bird for moving about said board;
(ii) a tree for providing a place of safety for a said bird;
(iii) a home base for each player, each home base being randomly placeable on said board and being provided for storing select game pieces;
(iv) a plurality of weapons for destroying select game pieces;
(v) a plurality of tablets adapted to be collected by a said player;
(vi) a plurality of markers, each marker for placement on a space on said board;
(vii) a pair of transport gates to permit rapid movement across said board;
(viii) a plurality of crystals for freezing a said bird of an opponent;
(c) a chance device used to determine player moves;
(d) players being permitted to move their birds and any crystals responsive to operation of said chance device, the object of said game being to obtain a predetermined number of tablets, using said birds to bring said tablets back to a respective said home base.

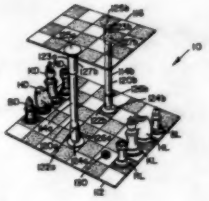
4,927,156
PROPERTY DEALING GAME
Jeffrey D. Breslow, Highland Park; John V. Zaruba, Chicago, and Donald A. Rosenwinkel, Oak Park, all of Ill., assignors to Breslow, Morrison, Terzian & Associates, Inc., Chicago, Ill.
Filed Feb. 6, 1989, Ser. No. 307,331
Int. Cl.[5] A63F 3/00
U.S. Cl. 273—256 **10 Claims**





1. A game for a number of players comprising in combination:
means defining a path of spaces;
some of the spaces representing properties;
the spaces not representing properties containing directions affecting play of the game;
a supply of simulated money;
an opaque container for each of the properties;
each container being identified with and removably fitting on a space representing a particular property;
each container having a slot through which a piece of the money may be inserted;
each container being capable of holding a number of pieces of the money while obscuring the total amount of the money being held in the container; and
means for obtaining access to the interior of the container to determine the amount of the money contained in the box.

4,927,157
CHESS-LIKE BOARD GAME APPARATUS AND METHOD OF PLAYING THE SAME
Clayton Rihiluoma, 3923 Foss Rd., No. 101, Minneapolis, Minn. 55421, and Kurt R. Miller, 4902 London Rd., Duluth, Minn. 55804
Continuation of Ser. No. 697,270, Feb. 1, 1985, abandoned, which is a continuation of Ser. No. 409,260, Aug. 19, 1982, Pat. No. 4,494,868. This application Sep. 19, 1989, Ser. No. 410,002
Int. Cl.[5] A63F 3/02
U.S. Cl. 273—260 **6 Claims**

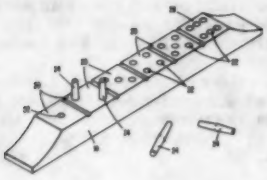


1. A board game apparatus for a chess-like game having multiple playing pieces, comprising:
(a) a first generally flat game board defining a playing surface with forty-two identifiable positions arranged in seven rank and six file rows, forty of the identifiable positions being playing positions available for occupancy and movement thereacross by the playing pieces, two of the identifiable positions being non-playing positions, which are not available for occupancy or for movement thereacross by the playing pieces, one of said non-playing positions being positioned in a second file row from a first side edge of the game board and one of said non-playing positions being positioned in a second file row from a second side edge of the game board, both of said non-playing positions being positioned in a fourth rank row from both ends of the game board;
(b) two sets of distinguishable playing pieces, each of said sets having less than sixteen playing pieces and including four playing pieces being identifiable from one another, the moves of said four identifiable playing pieces being defined according to a predetermined set of game rules, said four identifiable playing pieces having moves similar to those of the king, knight, bishop, and rook in the game of chess; and
(c) each of the two sets of playing pieces being positioned in the opposing rank rows immediately adjacent opposite ends of the game board at the start of the game, the bishop and rook playing pieces being positioned in the second file rows from the side edges of the game board so as to be in the same file rows as the non-playing positions at the start of the game, the knight and rook playing pieces of each set of playing pieces being positioned in the third file rows from the side edges of the game board.

4,927,158
GAME
W. O. Lierman, 2510 Fremont St., Boulder, Colo. 80302
Filed Dec. 23, 1985, Ser. No. 812,837
Int. Cl.[5] A63F 3/08
U.S. Cl. 273—268 **1 Claim**

1. An improved game device for aiding the learning of basic skills and providing extensive entertainment comprising:
a plurality of game boards each having a scoring section;
each said score section having 21 peg receptacles for scoring;
said peg receptacles are segregated in the form of numeric indicia of a die from 1 through 6;

a die, said die with faces having numeric indicia on said faces;



a plurality of associated pegs, said pegs being constructed for placement in said peg receptacles for scoring.

4,927,159

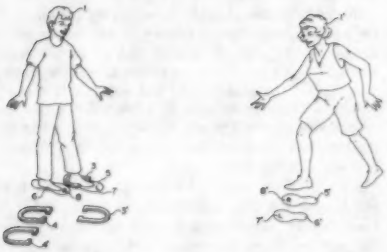
GAME OF HORSESHOES

Mark E. Morrissey, Box 7210 Franklin Rd., Evans City, Pa. 16033, and Thomas Schlemer, Jr., 47 Hempstead Ave., Pittsburgh, Pa. 15229

Filed Aug. 29, 1989, Ser. No. 400,083

Int. Cl.[5] A63B 67/06

U.S. Cl. 273—338 **8 Claims**



1. A method of playing a game of horseshoes, between at least a first and second player including the steps of:

(a) providing each said first and second player with at least one pair of horseshoes made from a resilient material each having an opening end;

(b) providing each said first and second player with a marker;

(c) positioning said first player at a predetermined distance from said second player;

(d) placing said marker of said first player underneath a foot of said first player;

(e) commencing playing the game of horseshoes by having said second player toss said horseshoes one at a time at the feet of said first player;

(f) awarding points to said second player by landing said horseshoes in a predetermined location with respect to said first player's feet;

(g) continuing play by repeating steps (d) through (f) wherein said marker of said second player is placed underneath a foot of said second player and said first player tosses said horseshoes at the feet of said second player; and

(h) ending play when said first and second players have had the same number of tosses of horseshoes and a predetermined winning number of points have been scored by either said first or second player.

4,927,160

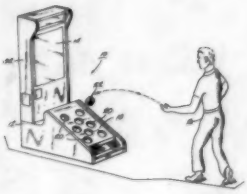
ELECTRONIC BAG TOSS GAME WITH LIGHT-ACTIVATED DETECTION

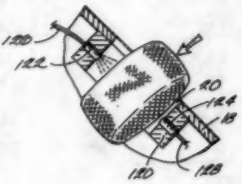
Thomas W. Nichol, 3765 Maple Wood Ct., Hubertis, Wis. 53033; Edward T. Gisske, Verona, Wis., and Arlyn Johnson, 7350 N. 76th St., Milwaukee, Wis. 53223, assignors to Thomas W. Nichol, Hubertis and Arlyn Johnson, Milwaukee, both of, Wis.

Continuation-in-part of Ser. No. 300,134, Jan. 23, 1989. This application May 8, 1989, Ser. No. 351,952

Int. Cl.[5] A63B 63/00, 71/04

U.S. Cl. 273—371 **8 Claims**





1. An automated bag toss game, comprising:

a game board surface, having a plurality of holes formed therein;

at least one item to be tossed:

light-activated sensing means, disposed generally beneath said game board surface and aligned with said holes, for sensing the passage of said item into one of said holes and producing a signal corresponding to the particular hole into which the item passed.

4,927,161

CHIP SHOT GAME

Rex D. Brenneman, 2244 Osage, Wichita, Kans. 67213

Filed Apr. 20, 1989, Ser. No. 340,801

Int. Cl.[5] A63B 67/06

U.S. Cl. 273—402 **3 Claims**

1. A throwing game and device wherein projectiles are tossed, pitched or lobbed by players standing on a first target area at a second target area comprising:

a pair of target structures each being formed in a rectangular, shallow, box shape and each having front, back, said and inside supports sufficiently strong to support the weight of said players;

a target area having a plurality of circular openings adapted to be supported on top of each of said target structures;

a linkage adapted to connect said pair of target structures in a fixed, spaced apart relationship; and

a plurality of projectiles for pitching at said target areas.

4,927,162

DARTBOARDS

Henry W. Kicks, 22 Orchard Close, and Malcolm Kicks, The Daubers, Keddington Road, both of Haverhill, Suffolk, England

Continuation of Ser. No. 63,133, May 18, 1987, abandoned. This application Nov. 22, 1988, Ser. No. 274,921

Claims priority, application United Kingdom, Sep. 23, 1985, 8523446; Apr. 24, 1986, 8610011

Int. Cl.[5] F41J *3/00*

U.S. Cl. 273—408 **5 Claims**

1. A dartboard of compressed sisal fibers having beds on a face of the board defined by wire, said wire having a quadrilateral cross-section, one corner of the wire being in contact with the board face, the opposite corner being exposed to the oncoming darts and the remaining two corners of the wire being spaced away from the board face, the wire being arranged to extend both radially and in a circle on the face, wherein a radially extending wire has sides that define a cross-section which is at least in part tapered, the radially extending wire being arranged on the board with the sides which define the tapered cross-section facing away from the board, and wherein a radially extending wire and a circularly extending wire cross over one another on the face, there being provided a notch in the part of either a radially extending or a circularly extending wire which is adjacent to the other at the cross-over point, or notches in the parts of each of the radially extending and the circularly extending wires which are adjacent to the other at the cross-over point.

4,927,163

STORM INFILTERATION DISK WITH FILTER

Stanley Gagas, 3642 E. American Ave., Oak Creek, Wis. 53154

Filed Dec. 22, 1988, Ser. No. 288,464

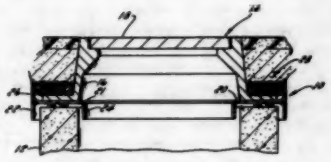
Int. Cl.[5] F16J *15/10*; E02D *29/14*

U.S. Cl. 277—23 **5 Claims**

1. An infiltration system for sealing the gap between a manhole and a manhole cover assembly, said system comprising:

an infiltration disk positioned between the manhole and the manhole cover assembly,

said disk including a circular plate having a flange on the outer periphery thereof extending above and below said plate,



said flange encircling the outer perimeter of the manhold and being spaced radially outwardly from said manhole cover assembly, and

a filtration means positioned in said radial space between said flange and said cover assembly for preventing ingress of solid matter into said radial space between said manhole cover assembly and said flange.

4,927,164

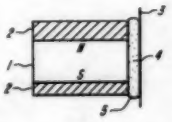
FERROFLUID SEAL WITH EPOXY POLE PIECES

Kuldip Raj, Merrimack, N.H.; Joseph Moses, Tyngsboro, Mass.; Ronald Moskowitz, Hollis, and Frank Bloom, Windham, both of N.H., assignors to Ferrofluidics Corporation, Nashua, N.H.

Filed Aug. 8, 1988, Ser. No. 229,640

Int. Cl.[5] F16J *15/40*

U.S. Cl. 277—80 **15 Claims**



1. In a ferrofluid seal for sealing an object, said seal having a permanent magnet positioned about said object, at least one pole piece attached to said magnet, said pole piece extending near said object to form a gap and ferrofluid in said gap, the improvement wherein said pole piece is fabricated entirely from an adhesive material, which material adhesively bonds directly to said magnet to form a hermetic seal between said pole piece and said magnet.

4,927,165

MASTER/SLAVE HYDRAULIC SYSTEM FOR ADJUSTING THE SUPPORT WHEELS OF AN ARTICULATED IMPLEMENT

David L. Murray, Lee's Summit, Mo., assignor to Deutz-Allis Corporation, Norcross, Ga.

Filed Feb. 27, 1989, Ser. No. 315,491

Int. Cl.[5] B62D *33/08*

U.S. Cl. 280—43.23 **2 Claims**

1. A wide implement comprising:

a main frame having a pair of frame sections extending laterally in end-to-end relation to one another with their adjacent laterally inner ends pivotally connected on a longitudinal horizontal axis extending in the direction the implement travels during a field working operation,

laterally spaced inner and outer support wheels connected in vertically adjustable supporting relation to the laterally

inner portion and laterally outer portion, respectively, of each of said frame sections, and

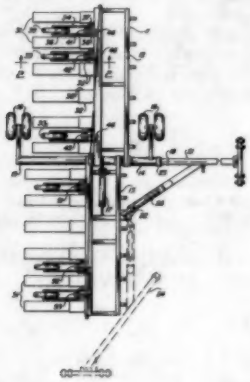
an hydraulic control system providing equalized wheel support for said implement including

a laterally outer hydraulic master jack operatively interconnected between one of said frame sections and the laterally outer support wheel adjustably connected thereto

a laterally inner hydraulic master jack operatively interconnected between said one frame section and the laterally inner support wheel adjustably connected thereto

a laterally outer hydraulic slave jack operatively interposed between the other frame section and the laterally outer support wheel adjustably connected thereto

a laterally inner hydraulic slave jack operatively interposed between said other frame section and the laterally inner support wheel adjustably connected thereto, said jacks being linearly extensible and contractible and having corresponding first and second ends



a source of pressurized hydraulic fluid including a pump and a fluid reservoir

a control valve having raise, lower and hold positions of adjustment and connected in fluid receiving relation to said pump and in fluid return relation to said reservoir, said valve presenting a pair of supply ports,

conduits connecting said first corresponding ends of said master jacks in parallel to one of said supply ports,

a conduit connecting said second end of the laterally outer master jack to said first end of said laterally inner slave jack,

a conduit connecting said second end of said laterally inner master jack to send first end of said laterally outer slave jack and

conduits connecting said secondn ends of said slave jacks in parallel to the other of said supply ports of said valve.

4,927,166

REAR WHEEL STEERING DEVICE FOR AUTOMOTIVE VEHICLES

Akira Takahashi, and Yuji Soejima, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 17, 1989, Ser. No. 312,039

Claims priority, application Japan, Feb. 25, 1988, 63-24432

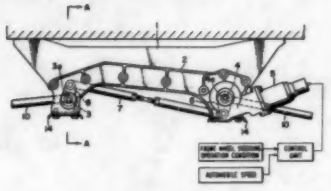
Int. Cl.[5] B62D *5/10*

U.S. Cl. 280—91 **6 Claims**

1. A rear wheel steering device for automotive vehicles, of the type in which a double-link type of a rear suspension having rear wheels, and a front and a rear pair of suspension arms against an automotive body respectively so as to rotatably support the rear wheels:

supporting pins supporting base end portions of at least one of the front and the rear pairs of suspension arms to be suspension cross member of the automobile body;

supporting shafts supporting the other pair of suspension arms to the automobile body, with one of the end portions of said supporting shafts being rotatably mounted to said suspension cross member, and with t he other end portions of said supporting shafts having eccentric shaft portions interconnected by a connecting rod;



said eccentric shaft portions being fitted with sliding bushes comprising an elastic circular ring and an inner cylinder rotatably supporting base end portions of the other pair of suspension arms; and

an actuator to rotate one of said supporting shafts, so that the other supporting shafts is rotated in the same direction by the connecting rod.

4,927,167

AMBULATORY WHEELSTAND

Daniel W. Davis, 1367 Merle Ave., Burton, Mich. 48509

Filed Mar. 21, 1988, Ser. No. 171,678

Int. Cl.[5] B62M *1/14*

U.S. Cl. 280—250.1 **20 Claims**

15. An ambulatory wheelstand for a user having a center of gravity, said wheelstand comprising:

a frame having a pair of elongated, spaced lateral supports and at least one cross support extending between said lateral supports at a front end of said frame;

two large diameter drive wheels rotatably attached to said lateral supports towards a rear end of said frame;

at least one castor wheel attached to said frame towards the front end, said wheels being adapted to support said frame above a ground surface;

a user support structure pivotably secured to said frame and movable between at least an upright position, in which said structure is substantially vertical, and a prone position, in which said support is substantially horizontal; and

means for pivoting said user support structure so that, regardless of its position, the center of gravity of the user supported by the support structure remains above substantially a single point with respect to said frame;

said means for pivoting comprising:

(a) a portion of each of said lateral supports defining an elongated slot therewith, each slot extending substantially parallel to said lateral supports;

(b) a pair of hinge pins secured coaxially to said user support structure, one of said hinge pins being slidably entrained in

each of said slots and movable between at least a front end and a rear end of said slot; and

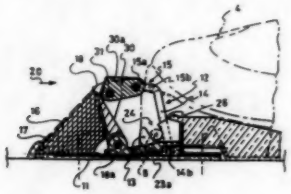
(c) at least one pivot arm having a first end pivotably secured to said frame in front of said slots and a second end pivotably secured to said user support structure toward the chest plate end from said hinge pin, wherein said hinge pin is disposed at the front end of said slot when the user support structure is in the upright position and at the rear end of said slot when the user support structure is in said prone position.

4,927,168

CROSS-COUNTRY SKI BINDING

Marc Provence, Thornes-Les-Glieres, and Didier Rousset, Les-cheraines, both of France, assignors to Salomon, S.A., Annecy Cedex, France

Filed May 31, 1989, Ser. No. 359,438
Claims priority, application France, Jun. 9, 1988, 88 08034
Int. Cl.[5] A63C 9/18
U.S. Cl. 280—615 **13 Claims**



1. A cross-country ski binding for latching a shoe or boot on a cross-country ski and for allowing rotation of the shoe or boot about an axis substantially perpendicular to the longitudinal axis of the ski, the shoe or boot being provided at its front end with a journal element, said binding comprising:

journal means complementary to and for cooperation with the journal element of the shoe or boot, a bridling stirrup for engagement with the front end of the shoe or boot, said bridling stirrup being journalled on the ski for movement about an axis substantially perpendicular to the longitudinal axis of the ski, said bridling stirrup being biased by an elastic device, said elastic device also exerting a return force on the shoe or boot when it is lifted from the upper surface of the ski while retained thereon by said bridling stirrup, an element positioned in front of and at a distance from said bridling stirrup, said element comprising a transmission plate for transmission of the forces of said elastic device, the lower end of said plate being journalled relative to the ski, said binding further comprising a connecting rod, wherein said upper end of said plate is journalled on said connecting rod, said connecting rod being journalled on said bridling stirrup, wherein said elastic device exerts said return force on said bridling stirrup by said plate.

4,927,169

SUSPENSION SYSTEM WITH CONSTANT CAMBER

Onofrio Scadutn, 1623 S. 56th Ct., Cicero, Ill. 60650

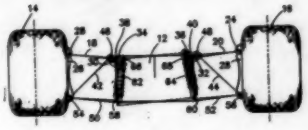
Continuation-in-part of Ser. No. 212,218, Jun. 27, 1988, Pat. No. 4,854,603. This application Dec. 23, 1988, Ser. No. 288,991
Int. Cl.[5] B62D 17/00
U.S. Cl. 280—661 **21 Claims**

17. A vehicle suspension system for maintaining zero degree camber comprising:

right and left suspension assemblies for mounting right and left wheel assemblies to a vehicle chassis;

said suspension assemblies each comprising an upper control arm and a lower control arm, each having an outer end for connecting to a wheel assembly and an inner end for connecting to a chassis,

a control lever pivotally connected to said chassis at a fulcrum and having a free outer end connecting on of said upper and lower control arms to said chassis for enabling said control arm to extend and retract for maintaining a wheel assembly at a constant camber in response to tilt of said chassis, said control lever having a length that is less than one-half the length of the control arm, and



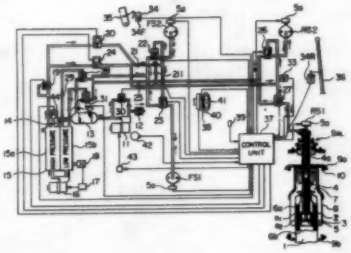
a control rod having an inner end connected to said control lever on a common side of said fulcrum with said control arm and an outer end connected to one of said upper portion and said lower portion of said wheel assembly for maintaining a wheel of said wheel assembly at a substantially constant camber in of said wheel assembly response to a roll force of said chassis about the roll axis of said chassis.

4,927,170

SUSPENSION CONTROL APPARATUS FOR AN AUTOMOTIVE VEHICLE

Shunichi Wada, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 8, 1989, Ser. No. 320,435
Claims priority, application Japan, Mar. 8, 1988, 63-55262
Int. Cl.[5] B60G 17/00
U.S. Cl. 280—707 **7 Claims**



1. A suspension control apparatus for an automotive vehicle comprising:

attitude-adjusting means for adjusting the attitude of a body of a vehicle;

an acceleration sensor which senses the acceleration of the vehicle body and produces a corresponding output signal, said output signal having a neutral point corresponding to no acceleration;

correcting means for correcting the output of said acceleration sensor for drift of the neutral point from a predetermined value; and

control means for controlling said attitude-adjusting means in accordance with the corrected output of said acceleration sensor so as to suppress a motion of the vehicle body caused by the acceleration which is sensed by said acceleration sensor.

4,927,171

VEHICLE SUSPENSION SYSTEM

Nils G. Westerlund, Kungalu, Sweden, assignor to The Secretary of State for Trade and Industry in Her Brittanic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, United Kingdom

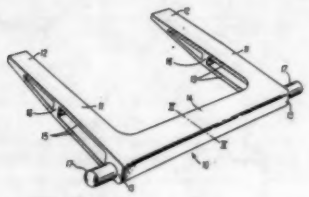
PCT No. PCT/GB87/00272, § 371 Date Dec. 13, 1988, § 102(e) Date Dec. 13, 1988, PCT Pub. No. WO87/06540, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 24, 1987, Ser. No. 288,084

Claims priority, application United Kingdom, Apr. 24, 1986, 8610029

Int. Cl.[5] B60G 11/02

U.S. Cl. 280—718 25 Claims



1. A vehicle suspension unit including two arms secured together by and perpendicular to a cross member, each arm comprising two cantilever springs formed from fibre reinforced plastics material which are secured together at each of a first and a second end of the arm and which between these ends are separated in a plane perpendicular to a plane of the arms and cross-member by the cross-member and by a spacing member at a position between the first ends and the cross-member.

4,927,172

MECHANICAL ACCELERATION SENSOR

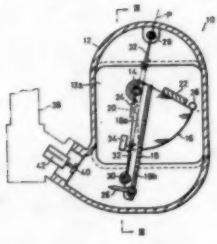
Yasuki Motozawa, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 26, 1989, Ser. No. 342,836

Claims priority, application Japan, Apr. 27, 1988, 63-102653

Int. Cl.[5] B60R 21/32; F42C 1/04

U.S. Cl. 280—734 9 Claims



1. A mechanical acceleration sensor comprising:

a housing;

a weight rotatably supported by said housing;

an actuating arm rotatable about an axis parallel or coaxial to an axis of rotation of said weight and abutting against said weight when rotated toward said weight;

a toggle spring preloaded between said actuating arm and said housing for usually biasing said actuating arm in one direction such that said actuating arm abuts against said weight to prevent said weight from rotating and, when said weight is rotated to a predetermined position together with said actuating arm against a biasing force of said toggle spring, urging said actuating arm in a direction opposite to said one direction such that said actuating arm is released from said weight and rotated alone;

an actuating member mounted on said actuating arm; and

an output device positioned on a path along which said actuating member is movable and being operated by said actuating member when said actuating arm is rotated to a predetermined position away from said weight.

4,927,173

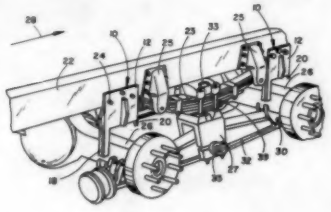
APPARATUS FOR PREVENTING TRUCK ROLL OVER IN THE EVENT OF FAILURE OF ITS SUSPENSION SYSTEM

Raymond E. Clifton, Jr., 9746 Rte. 99, P.O. Box 202, Ellicott City, Md. 21043

Continuation-in-part of Ser. No. 128,712, Dec. 4, 1987, abandoned. This application Aug. 22, 1988, Ser. No. 234,605

Int. Cl.[5] B60R 21/02; B60G 11/04

U.S. Cl. 280—755 21 Claims



1. In a motor vehicle having a frame, a suspension supporting the frame, and tires, wheels, and axles within housings spaced from the frame by the suspension, apparatus comprising:

rigid means extending forward from the frame, rigidly connected with said frame and having a lower free terminal end, for engaging at least one vertical side of an axle housing for preventing the frame from translating away from the axles when the suspension fails during movement of the vehicle and when said vertical side of the axle housing contacts said downwardly extending rigid means.

4,927,174

STEERING COLUMN COUPLING

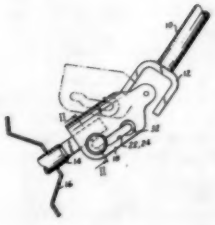
Bryan Jones, Chelmsford, England, assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 2, 1988, Ser. No. 278,907

Claims priority, application United Kingdom, Dec. 4, 1987, 8728414

Int. Cl.[5] B62D 1/18

U.S. Cl. 280—777 10 Claims



1. A steering column coupling for attaching a steering driveshaft to a non-round stub shaft which is connected to a steering rack operating member and is adapted to be turned about a

longitudinal axis to operate the steering rack, the coupling comprising a connection link pivoted to the lower end of the steering shaft, the link having a longitudinal recess with a cross-section complementary to that of the stub shaft, the recess being open at one side to receive the stub shaft, and the link including a bolt which can be tightened to clamp the shaft in the recess, the bolt being arranged so that it is captive on the link but can slide longitudinally along the link between a first position where it does not obstruct the side opening of the recess, and a second position in contact with the stub shaft where it can be tightened to clamp the stub shaft in the recess.

4,927,175

DRIVE DEVICE FOR RESTRAINING SYSTEMS IN MOTOR VEHICLES

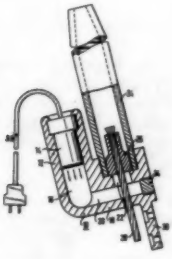
Artur Föhl, Schorndorf, Fed. Rep. of Germany, assignor to TRW Repa GmbH, Alfdorf, Fed. Rep. of Germany

Filed Jun. 15, 1989, Ser. No. 366,780

Claims priority, application European Pat. Off., Sep. 29, 1988, 88116072.5

Int. Cl.[5] B60R *21/10*

U.S. Cl. 280—806 **15 Claims**



1. A drive device for restraining systems in motor vehicles comprising a working chamber and a pyrotechnical gas generator, which, when energized, produces gas with an operating temperature and acting on said working chamber, said working chamber comprising an outwardly leading relief and a closure element sealing said relief path and consisting of a material which at a temperature exceeding said operating temperature but not exceeding a self-igniting temperature of said gas generator softens at least to such an extent that said closure element on self-ignition of said gas generator frees said relief path but, at temperatures corresponding to said operating temperature, has a sufficient mechanical strength to ensure that said relief path remains sealed by said closure element under exposition to gas produced by said gas generator.

4,927,176

SKI-MOUNTABLE DEVICE FOR SCRAPING BOOTS

Allen B. King, and Thomas J. Perfetti, both of Vail, Colo., assignors to Exci-Tech Industries, Inc., Vail, Colo.

Filed Nov. 23, 1988, Ser. No. 275,403

Int. Cl.[5] A63L *11/18*

U.S. Cl. 280—813 **1 Claim**

1. A boot scraper for use on a snow ski, said scraper comprising:

an elongated, rectangularly shaped body;

means for removably mounting said elongated body on said snow ski so the integrity of the inner core of said snow ski is not harmed and said elongated body can be removed from said snow ski without harm to the finish of said snow ski; said mounting means comprising double-backed high tensile strength adhesive tape corresponding to said rectangular shape of said elongated body;

means formed in the upper surface of said elongated body for scraping debris from the sole of a boot; said scraping means comprising outer side surfaces formed on the opposing and longer edges of said elongated body, said formed outer edges extending upwardly and inwardly toward each other from the bottom surface of said elongated body, each of said formed outer edges terminating in narrow rectangular lip surfaces formed on the upper surface of said elongated body, said narrow rectangular lip surfaces being parallel to each other and to the bottom of said elongated body and functioning to remove said debris from said sole as said sole is scraped across both said narrow rectangular lip surfaces, each of said narrow rectangular lip surfaces being located a predetermined distance from said bottom surface of said elongated body;

means for directing said scraped debris from said sole, said directing means comprising a longitudinal channel having a circular shaped arc cross-section, the radius of said circular shaped arc being substantially less than said predetermined distance;

means to allow said elongated boy to substantially flex about the longitudinal axis of said snow ski at temperatures below zero degrees as said snow ski flexes so there is limited impairment of the performance of said snow ski, said flexing means comprising forming said body of a material having the properties of resilience and flexibility at temperatures below zero degrees; said flexing means further comprising forming said channel to extend substantially half of the thickness of said body and mounting said body so said channel extends along the central longitudinal axis of the rectangularly shaped portion of said snow ski; and

means formed on opposing ends of said elongated body for deflecting crossed ski tails; said deflecting means comprise forming said opposing ends of said elongated body in a low-profile shape with inwardly sloping corners and parallel scraping edges.

4,927,177

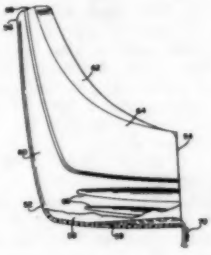
CUSTOM MOLDED VEHICLE SPLASH GUARD

Robert A. Price, Glencoe, Ill., assignor to G-P Manufacturing Co., Inc., Chicago, Ill.

Division of Ser. No. 259,868, Oct. 19, 1988, Pat. No. 4,877,268. This application Aug. 8, 1989, Ser. No. 391,119

Int. Cl.[5] B62D *25/16*

U.S. Cl. 280—851 **7 Claims**



1. A custom molded vehicle splash guard for attachment to

a lower portion of a vehicle fender adjacent a corresponding wheel well so as to intercept debris thrown rearwardly by a corresponding vehicle tire to prevent the debris from impacting the fender portion comprising:

a display surface having an inner edge, an outer edge, an upper portion, a substantially planar portion and a lower edge;

a slightly concave mounting surface having an inner edge, an outer edge, an upper portion and a lower edge; and

a central portion extending between and connecting said mounting surface and said display surface along said outer and lower edges thereof, forming a U-shaped pocket open along said inner edges, with said display surface and said mounting surface being in generally parallel relation to each other;

wherein said display surface is configured to be trimmed to generally correspond with the outer profile of the vehicle fender portion, and said mounting surface is configured to be secured to a wall of the wheel well adjacent the fender portion, and, upon mounting, the inside edge of said display surface being in engagement with the fender portion.

4,927,178

INDEXED REFERENCE BOOK

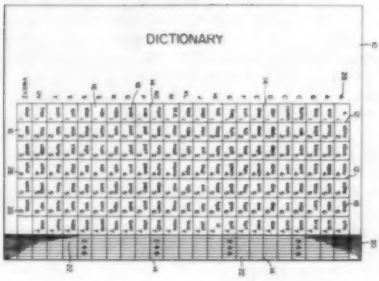
Eliezer Schechter, 21 Usishkin St., Jerusalem, Israel

Filed Oct. 18, 1988, Ser. No. 259,058

Claims priority, application Israel, Nov. 1, 1987, 84325

Int. Cl.[5] B42F *21/00*; G09B *19/08, 3/06*

U.S. Cl. 283—38 **9 Claims**



1. An indexed reference book for rapidly locating words or material arranged in an alphabetical order in the pages of said book, said reference book comprising:

front cover means having an array of index zones arranged in rows and columns for bearing identifying indicia, each of said index zones bearing indicia corresponding to indicia appearing on different pages of said book, and the indicia in said index zones being arranged in alphabetical order from a beginning to an end of a first row and then continuing from a beginning to an end in a subsequent row while the pages bearing indicia corresponding to the indicia contained in two adjacent zones in a row are separated from each other by interposed pairs of facing pages, said pairs of pages corresponding in number to the number of rows in an index column minus one, said pages being arranged in an order dictated by the respective index zones rather than in a continuous alphabetical order, a fore-edge of the pages of said book being marked by tab means for identifying a location of indicia, said tab means being arranged along the fore-edge of the book in rows and columns, so that the tab means of a page bearing specific indicia corresponds in its horizontal positioning on the fore-edge of the book to the respective row and column of the index zone bearing said indicia and the number of tabs in each row corresponds to the number of zones in the same row.

4,927,179

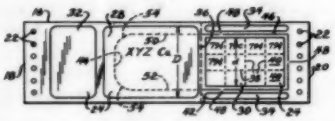
SHIPPING LABEL WITH PRICE TAG SECTION

Barbara A. Ehret, Seattle, and James H. Pearce, III, Rothell, both of Wash., assignors to Uarco Incorporated, Barrington, Ill.

Filed Dec. 27, 1988, Ser. No. 289,700

Int. Cl.[5] B42D *15/00*

U.S. Cl. 283—79 **10 Claims**



1. A pressure sensitive adhesive business form for use in shipping merchandise for subsequent sale comprising:

a first ply of release liner;

a second ply of label stock and having a pressure sensitive adhesive on one side thereof releasably adhered to said first ply;

said label stock ply having a shipping label section and a price tag section;

said price tag section comprising a plurality of individual and separable price tags, and having one dimension that is less than the corresponding dimension of said shipping label section and being closely adjacent said shipping label section and at least nominally centered with respect to one edge thereof that is parallel to the direction of said dimensions; and

a closed line of perforation in said release liner ply including generally parallel sections spaced apart a distance equal to or somewhat greater than said price tag section one dimension which extend in a frame-like pattern within at least two opposed sides of said shipping label section and about the periphery of three sides of said price tag section;

whereby said shipping label section and said price tag section may be printed upon simultaneously and thereafter, that part of said release liner defining said frame-like pattern removed to expose pressure sensitive adhesive on said two opposed sides of said shipping label section, said price tag section folded along said edge and under said shipping label section and said shipping label section adhered to a shipping container by said exposed pressure sensitive adhesive in superimposed relation to said price tag section.

4,927,180

MARKING OF ARTICLES WITH PHOTOCHROMIC COMPOUNDS

Clive Trundle, Silverstone, and Jack Brettle, Greens Norton, both of England, assignors to Plessey Overseas Limited, England

PCT No. PCT/GB87/00592, § 371 Date Jun. 6, 1988, § 102(e) Date Jun. 6, 1988, PCT Pub. No. WO88/01288, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 21, 1987, Ser. No. 187,690

Claims priority, application United Kingdom, Aug. 22, 1986, 8620430

Int. Cl.[5] B42D *15/00*

U.S. Cl. 283—70 **11 Claims**

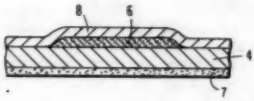
1. A security device in the form of a label, document or card which incorporates a security mark or device which is partially or wholly invisible in light which does not contain a U.V. component, said device comprising:

(a) a flexible substrate having printed thereon a mark or device in a clear, dried, reversibly photochromic ink film, said ink in its liquid state comprising a solution of from 1 to 5% of a photochromic compound in a solvent/resin medium and said photochromic compound being selected

from fulgides, fulgimides, benzopyrans and naphthopyrans and said dried ink film being from 10 to 60 microns thick, and

(b) a clear, superficial protective layer extending over said mark or device, which gives protection for the photochromic compound against degradation by atmospheric moisture and oxygen,

whereby said photochromic compound is converted to a colored form on exposure to U.V. light within about 60 seconds and reverts to a pale or substantially colourless form within about 2 minutes in the absence of U.V. light.



4,927,181

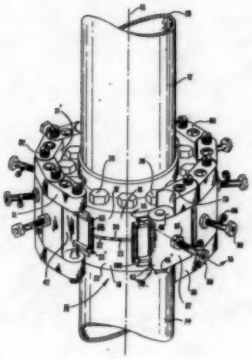
APPARATUS AND METHOD FOR SEALING LEAKS

Alfredo A. Ciotola, 1060 Revere Ave., Bronx, N.Y. 10465

Filed Jun. 22, 1989, Ser. No. 370,327

Int. Cl.[5] F16L *55/16*

U.S. Cl. 285—15 **33 Claims**



1. An apparatus for sealing leaks at a circumferential surface of an article, which apparatus comprises in combination:

a plurality of interlocking links constructed to form a circumferential collar on the circumferential surface surrounding the leak, the circumference of the collar can be varied by adding or removing links, each of said links having a sealing surface and constructed and arranged to exert radial pressure on the circumferential surface of the article; and

a sealing means disposed between the circumferential surface of the article and the links to seal the leak.

4,927,182

PIPELINE REPAIR CLAMP

Billy G. Moore, Montebello, Calif., assignor to Koppl Industrial Systems, Inc., Montebello, Calif.

Filed Jun. 4, 1987, Ser. No. 57,309

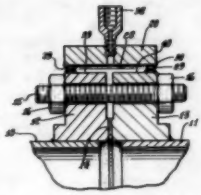
The portion of the term of this patent subsequent to Sep. 22, 2006, has been disclaimed.

Int. Cl.[5] F16L *55/16*

U.S. Cl. 285—15 **6 Claims**

1. In a clamp for repair of a leak at a flanged joint, said clamp comprising a plurality of arcuate clamp sections for assembly end to end to form a clamp ring positionable about the flanges of the joint, with each of said clamp sections having an inner surface with spaced edges,

the improvement comprising a seal tube of deformable metal fixed to each of said clamp sections at each of said edges, with each of said seal tubes having a folded wall with at least one ridge between troughs, with said ridge exposed adjacent the clamp section edge when in engagement with a flange, and deformable by pressure engagement between said clamp and flanges and deformable by peening on said ridge at a trough to obtain a cold-forged metallic joint between the clamp and the flange.



4,927,183

ADAPTING PIECE OF THERMOPLASTIC MATERIAL

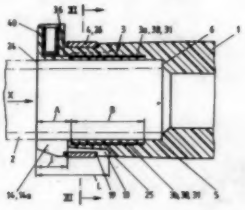
Hans-Werner Steinmetz, Schaffhausen, and Fritz Reich, Uhwiesen, both of Switzerland, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

Continuation-in-part of Ser. No. 58,990, Jun. 8, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,075

Claims priority, application Switzerland, Jun. 25, 1986, 02562/86

Int. Cl.[5] F16L *21/08*

U.S. Cl. 285—21 **6 Claims**



1. An adapting piece of weldable thermoplastic material, comprising at least one welding sleeve portion with an electric heating device, the welding sleeve portion being adapted for weld-connecting the adapting piece to a tubular piece, the welding sleeve portion having an end face, a longitudinal axis and a circumference, the electric heating device comprising windings extending in longitudinal direction, the electric heating device in circumferential direction forming two winding portions which are connected in parallel, the windings having a middle in longitudinal direction, the welding sleeve portion defining a plurality of radial incisions extending in longitudinal direction, wherein, starting at the end face over a first part in longitudinal direction of the welding sleeve portion, the incisions are slots extending radially through the welding sleeve portion, each slot in the first part in longitudinal direction of the welding sleeve portion defining a gap at the radially inner end of the welding sleeve portion, the gap having surfaces which extend parallel to each other, the incisions extending longitudinally over a second part in longitudinal direction of the welding sleeve portion adjacent the first part to at least the middle of the windings, the windings of the electric heating

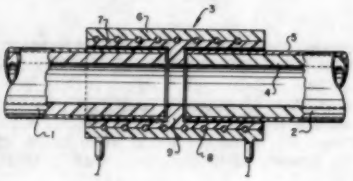
device being formed by a bare resistance wire embedded in the thermoplastic material of the adapting piece by injection molding the thermoplastic material around the windings when the adapting piece is manufactured, a clamping element mounted on the circumference of the welding sleeve portion, the clamping element being radially compressible after the tubular piece has been inserted and the welding sleeve portion has been aligned, whereby the tubular piece is clampable in an aligned position by clamping prior to welding, and whereby a substantially closed connection between the tubular piece and the welding sleeve portion is effected for building up a welding pressure required for the welded connection.

4,927,184

PIPES BASE ON POLYOLEFIN RESIN FOR MANUFACTURING PIPELINES AND COUPLINGS FOR ASSEMBLING THEM

Pierre Bourjot, Maden, and Marie-Anne Garnaud, la Garenne Colombe, both of France, assignors to Atochem, Paris la Defense, France

Filed Feb. 19, 1988, Ser. No. 157,888
Claims priority, application France, Nov. 7, 1986, 8615537
Int. Cl.[5] F16L *13/02*
U.S. Cl. 285—21 **9 Claims**



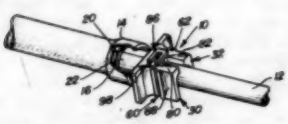
1. Pipes for manufacturing pipelines of great length by end-to-end assembly, comprising a wall having at least one layer of core material consisting essentially of a crosslinked polyolefin resin and at least one layer of surface material consisting essentially of a thermoplastic resin, said core material being crosslinked to a rate higher than 30%.

4,927,185

RELEASE TOOL FOR FLUID QUICK CONNECTORS

James McNaughton, Rochester, Mich., assignor to Huron Products Corporation, Mt. Clemens, Mich.

Filed Mar. 7, 1989, Ser. No. 319,960
Int. Cl.[5] F16L *35/00*
U.S. Cl. 285—39 **12 Claims**



1. A connector release tool for releasing a male fitting conduit from a female fitting connector coupled together by a retaining mechanism comprising:

means adapted for positioning about a peripheral surface of a male fitting conduit or the like, said positioning means comprised of a pair of integral members movable with respect to one another for positioning peripherally about the male fitting conduit or the like, said integral member having a smooth arcuate interior surface corresponding to an exterior surface of the male fitting, and a convex exterior surface such that when said pair of integral members are coupled together opposing one another they form a cylindrical annular portion and define a central axis, said integral members each also including a planar exterior surface portion substantially continuous with said convex exterior surface portion such that said planar exterior surface portions are on opposing sides of said central axis when said integral members are coupled together;

means for locking said members together when positioned peripherally about the male fitting conduit or the like, said locking means unitarily formed with said members;

said cylindrical annular portion adapted for opening retaining mechanisms retaining the male fitting conduit in a female fitting connector by inserting into the female fitting and spreading the retaining mechanisms; and

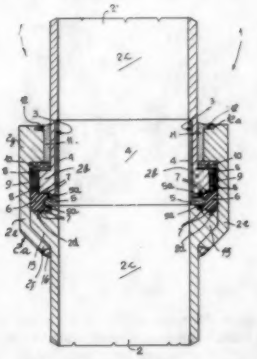
means for enabling gripping of the tool for enabling insertion of the tool into the female fitting for manual release of the male fitting conduit from the female fitting connector, said gripping means unitarily formed with said planar exterior surfaces.

4,927,186

DIELECTRIC JOINT, PARTICULARLY FOR METALLIC CONDUITS FOR LIQUIDS AND/GASES

Walter Zoboli, Via Prampolini 30, Formigine (Province of Modena), Italy

Continuation-in-part of Ser. No. 39,134, Apr. 16, 1987. This application Jun. 13, 1988, Ser. No. 205,693
Claims priority, application Italy, Apr. 18, 1986, 28969/86[U]
Int. Cl.[5] F16L *11/12*
U.S. Cl. 285—54 **8 Claims**



1. A dielectric joint, in particular for metal conduits for liquids and gases, comprising:

a first conduit length having a first outwardly protruding enlarged head, said first conduit length having a first inner surface and defining an inner annular recess extending at least at said first enlarged head, and said first enlarged head defining an outer diameter,

a second conduit length having a second outwardly protruding enlarged head facing towards said first enlarged head, said second conduit length having a further inner surface aligned to said first inner surface of said first conduit length,

a ring element surrounding said first and second enlarged heads, said ring element having an enlarged end portion surrounding said first conduit length at a portion of said first conduit length arranged near said enlarged head, said enlarged end portion of said ring element defining an annular interspace with said first conduit length and having an inner diameter which is smaller than said outer

diameter of said first enlarged head of said first conduit portion, said ring element further having a second end portion countershaped to and in contact with said second enlarged head and welded to said second conduit length,

a cylindrical element of highly electrical insulating material, said cylindrical element extending in said inner annular recess of said first conduit length and having a cylindrical inner surface extending flush with said inner surfaces of said first and second conduit lengths, said cylindrical element having a radial projection outwardly protruding and partially extending between said first and said second enlarged heads,

an annular gasket extending among and in contact with said first and second enlarged heads, said radial projection and said ring element, said annular gasket having first engagement means cooperating with said first and second enlarged heads and said radial projection for position blocking,

electric insulation elements and stiffening elements interposed between said ring element and said first conduit length and filling said annular interspace, said electric insulation and stiffening elements defining further engagement means engaging with said enlarged end portion of said ring element,

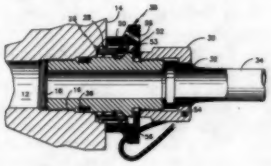
wherein said first engagement means of said annular gasket comprises tooth formations protruding from said annular gasket towards said first and second enlarged heads and engaging with corresponding recess formations defined in said first and second enlarged heads, an inner circumferential hole partially accommodating said radial projection, and annular cavities formed in said hole and accommodating corresponding collar elements formed on said annular projection.

4,927,187

FITTING WITH LOCK WIRE FEATURE

David L. Sanford, Stuart, and Gary W. Douglass, Palm Beach Gardens, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 26, 1989, Ser. No. 427,385
Int. Cl.[5] F16L *35/00*
U.S. Cl. 285—80 **3 Claims**



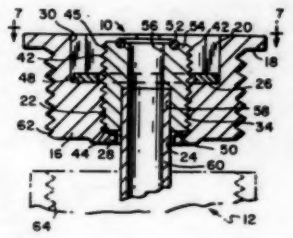
1. A safety wire retention device for a fitting to adapt a fluid connecting tube having an opening to a casing, said fitting including a ferrule attached to one end of said tube, an elongated tubular adapter having a central opening communicating with the opening in said tube, said tubular adapter being threaded at each end and one end threaded to a threaded tube nut for securing said ferrule to said tubular adapter and the other threaded end threadably attaching said adapter to said casing, said tubular adapter including an enlarged diameter portion spaced from one of said threaded ends and together with said threaded tube nut defining an annular space, a lock ring having internal splines and external splines, said tubular adapter having a splined portion on the outer diameter thereof being in splined engagement with said internal splines of said lock ring, said casing being in splined relation with said external splines, said external splines extending beyond said casing, said safety wire retention device comprising a collar surrounding said tubular adapter and having splines formed on the inner diameter of said collar engaging said external splines of said lock ring and an inner flange portion extending radially inwardly on said collar being trapped in said space provided by said enlarged diameter portion and one of said threaded ends, the end of said tube nut and an outer flange portion extending radially outwardly on said collar having a drilled hole adapted to receive the safety wire extending from a hole formed in said tube nut.

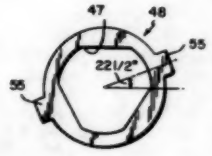
4,927,188

FITTING FOR CONNECTING A DRUM TO A PIPELINE

Philip W. Sands, Coventry, England, assignor to Shipley Company, Inc., Newton, Mass.

Filed Nov. 30, 1988, Ser. No. 278,018
Int. Cl.[5] F16L *41/08*
U.S. Cl. 285—89 **13 Claims**





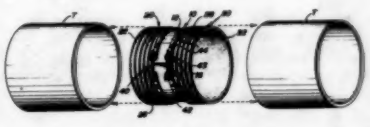
1. A coupling for connecting a drum to a pipeline, comprising a bung threaded into an end of the drum, said bung containing a through opening comprising concentric outer and inner openings, said outer opening being of a larger diameter than the inner opening, said inner opening being threaded, an externally threaded sleeve having inner and outer threaded ends containing a through passage, threaded at one end into the threaded inner opening in the bung with its inner end engaged with the inner threaded end of the inner opening of said bung and a draw tube fixed at one end to the inner end of the sleeve within the through passage of the sleeve and extending therefrom into the drum, said sleeve being contained entirely within said through opening of said bung and means for connecting the pipeline to the sleeve.

4,927,189

INTERNAL EXPANSION COUPLING DEVICE

John W. Burkit, 1506 Lincoln St., Bethlehem, Pa. 18017

Filed Apr. 10, 1989, Ser. No. 335,567
Int. Cl.[5] F16L *21/02*
U.S. Cl. 285—109 **10 Claims**



1. An internal expansion coupling device for joining a pair of tubular members comprising:

(a) an elongated open ended tubular joint member formed from a single, relatively rigid, rectangular sheet-like member, said member being defined by a pair of opposing sheet ends and a pair of opposing sheet sides, where the sheet ends overlap such that the end portions thereof lie contiguous with each other;

(b) a continous circumferential gasket sealing sleeve formed of an elastomeric material and overlapping each said sheet side about each open end of said tubular joint member, where said gasket sealing sleeve, about the circumference thereof, is provided with at least a pair of continuous upstanding ribs, each of which is adapted to lie adjacent to and be compressed against the inside wall of a tubular member; and

(c) means accessible externally thereof for expanding said sheet-like member whereby said sheet ends move circumferentially towards one another and said extending sheet-like member uniformly urges said elastomeric gasket sealing sleeve and said ribs against the inside walls of said tubular member thereabout.

4,927,190

HOSE FITTING

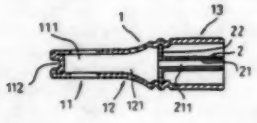
Masayuki Nishikawa, Inazawa; Takeshi Miyazaki, Nagoya; Terumitsu Shigeki, Nagoya; Satoshi Mitzutani, Kuwana, and Toru Isono, Kagamihara, all of Japan, assignors to Toyoda Gosei Co., Ltd, Nishikasugai, Japan

Filed Apr. 12, 1989, Ser. No. 336,814

Claims priority, application Japan, Mar. 30, 1987, 62-47581; Mar. 31, 1987, 62-78853; Mar. 31, 1987, 62-78854

Int. Cl.[5] F16L *55/00*

U.S. Cl. 285—175 12 Claims



1. A hose fitting comprising:

a hose fitting body including: a head portion having at least two flattened surfaces disposed parallel to each other and a fluid delivery through hole formed in the center of said flattened surfaces; a base portion continuing from said head portion and having a hollow truncated cone shape; and a cylindrical sleeve portion continuing from said base portion,

wherein said hose fitting body is integrally formed from a test tube-shaped workpiece, said flattened surfaces of said head portion being formed by pressing said test tube-shaped workpiece from opposite sides of its closed end in a manner parallel to each other while leaving space inside thereof, said base portion being formed of the intermediate portion of said test tube-shaped workpiece, and said sleeve portion being formed from the open end of said test tube-spaced workpiece, and

a nipple integrally fixed on the inner circumferential surface of said sleeve portion and having a fluid delivery hole therethrough.

4,927,191

ADJUSTABLE TUBULAR WALL STRUCTURE FOR CONNECTORS AND THE LIKE

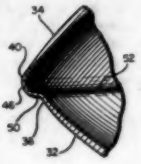
Erwin F. Mikol, Park Ridge, Ill., assignor to Twenthieth Century Companies, Inc., Wheeling, Ill.

Continuation-in-part of Ser. No. 487,865, Apr. 22, 1983, Pat. No. 4,846,510. This application Feb. 2, 1987, Ser. No. 9,671

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.[5] F16L *27/00*

U.S. Cl. 285—226 6 Claims



1. A tapered tubular wall structure for tubular conduits and the like, said wall structure comprising:

a tapered tubular body of pleated accordion fold configuration formed from a semi-rigid resiliently flexible material of substantially uniform gauge to define an encompassing wall of tapered tubular configuration that has a longitudinal central axis extending centrally and longitudinally of same;

said wall being formed to define along said central axis alternating thrust cone wall segments and Belleville washer-like wall segments of gradually diminishing inside and outside diameter integrally connected consecutively along the length of said pleated section;

said thrust cone wall segments defining a wide end portion at one end and a narrow end portion at the other end, said wall segments being spherically contoured;

said Belleville washer-like wall segments defining a wide end portion at one end and a narrow end portion at the other end, said wall segments being spherically contoured;

with each of said pleats each comprising a thrust cone wall segment and a Belleville washer-like wall segment integrally connected at their respective narrow end portions to define annular articulations therebetween and form the roots of the pleats;

with the wide end portion of each Belleville washer-like wall segment of each pleat being integral with the wide end portion of the thrust cone wall segment of the next consecutive pleat to form the crowns of the pleats;

said crowns of said pleats each respectively lying in a plane that extends normally of said axis and defining a radially outwardly distensible annular articulation between the Belleville washer-like wall segment and the thrust cone wall segment, said wide ends integrally connected thereat in circumambient relation thereabout for resiliently resisting distension of said crown radially outwardly thereof in the plane of the crown;

said Belleville washer-like wall segment of each pleat being proportioned to be wholly snap shifted through the said plane at the articulation between same and the thrust cone wall segment of the next adjacent pleat for disposing said pleats in contracted, nested relation and extended relation axially of said body;

with the respective pleats in their extended relations each having the said thrust cone wall segment thereof disposed relative to said Belleville washer-like wall segment thereof such that said other end of said thrust cone segment is disposed substantially 90° of said other end of said Belleville washer-like wall segment thereof annularly about said root of the respective pleats;

said proportioning of said Belleville washer-like wall segment at the respective pleats accommodating snap shifting

of one side only of said other end of same through said plane thereof at the said articulation thereof within and in stabilized seating relation against the thrust cone wall segment of the said next adjacent pleat, for disposing said thrust cone wall segment thereof in angled relation to such next adjacent pleat thrust cone wall segment; and

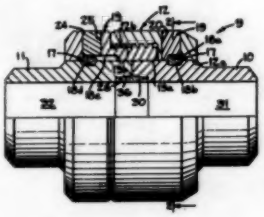
whereby said tubular body is stable in and may be preset, prior to use, in its said extended relation, contracted, nested relation and angled relation.

4,927,192

PIPE CONNECTOR LOAD ELEMENT

Tep Ungchusri, The Woodlands, and George D. Lemons, Stephenville, both of Tex., assignors to FMC Corporation, Chicago, Ill.

Filed Jun. 29, 1989, Ser. No. 372,807
Int. Cl.[5] F16L *19/02*
U.S. Cl. 285—305 **4 Claims**



1. A pipe connector load element for use in a pipe connector device having first and second pipe elements for connection in an end-to-end relationship, said first pipe element having a groove extending about the outer circumference of said first pipe element, a first retention member having an internal bore for receiving said first pipe element with said first retention member having a groove adjacent to said internal bore, means for selectively connecting said first retention member to said second pipe element, said load element being mounted in said pipe element groove and in said retention member groove to secure said pipe element to said retention member, said load element comprising:

a plurality of elongated components with each of said components being segments of a hollow cylinder with an inner surface of each of said components having a radius which mates with a groove in an outer circumference of a first pipe element, each of said components having a slot extending along a length of said component, said slot forming a "T" having a stem extending perpendicular from said inner surface and having a cross-bar at a top of said "T", said cross-bar extending parallel to said inner surface of each of said components; and

a flexible ribbon extending through said cross-bar portion of said slot in each of said components to thread said components to said ribbon in an end-to-end arrangement.

4,927,193

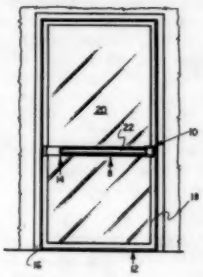
MOUNTING CASSETTE FOR PUSH-BAR EXIT DEVICES

Theodore H. Miller, New Britain, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.

Filed May 30, 1986, Ser. No. 868,851
Int. Cl.[5] F05C *3/12*
U.S. Cl. 292—92 **6 Claims**

1. A mounting cassette for an exit device mounted on a first side of a narrow stile door and having a cylinder lock mounted on the other side of said door, said exit device, and said cylinder lock being selectively operable to control movement of a latch bolt of a latch bolt assemble, said exit device having a first actuator connected to said latch bolt and said cylinder lock having a second actuator connected to the latch bolt, the longitudinal axis of said second actuator extending through the narrow stile and the longitudinal axis of said first actuator being inwardly offset along the horizontal axis of the door relative to the longitudinal axis of said second actuator, said mounting cassette including

first motion transmitting means mounted for rotation in said cassette and including coupling means for receiving said



second actuator for rotation of said motion transmitting means thereby;

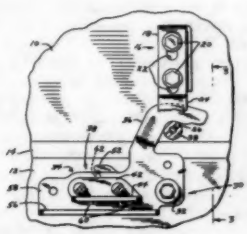
second motion transmitting means rotatably coupled with said first motion transmitting means for receiving said first actuator, with the longitudinal axis of said second motion transmitting means being inwardly offset along the horizontal axis of the door relative to the longitudinal axis of said first motion transmitting means.

4,927,194

INTERLOCK LATCH ASSEMBLY FOR RELEASABLY SECURING COWL SECTIONS OF AN OUTBOARD MOTOR

James L. Wagner, Neenah, Wis., assignor to Notron Engineering AG, Zollbruck, Switzerland

Filed Jul. 14, 1988, Ser. No. 219,086
Int. Cl.[5] E05C *19/10*
U.S. Cl. 292—128 **5 Claims**



1. For an outboard motor or the like having a power head enclosed by first and second cowl sections, a latch assembly for releasably securing said first and second cowl sections together, comprising:

catch means connected to one of said cowl sections;

latch means movably connected to the other of said cowl sections, said latch means comprising a latch member having a hook portion and a handle portion disposed on opposite ends thereof, said latch means being movable between an engaging position in which the hook portion of said latch means engages said catch means for securing said cowl sections together, and a disengaging position in

which said latch means and said catch means are disengaged; and

interlock means mounted to the same cowl section to which said latch means is connected for preventing movement of said latch means to its disengaging position when said latch means is in its engaging position, said interlock means comprising:

a stationary interlock member mounted to and projecting outwardly from said cowl section;

a movable interlock member mounted to said latch member, said movable interlock member being movable between a locking position, in which movement of said latch member to its release position is prevented due to engagement of said movable interlock member with said stationary interlock member, and a release position for allowing movement of said latch member to its disengaging position; and

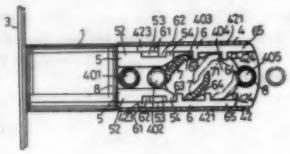
bias means for biasing said movable interlock member toward its locking position.

4,927,195

DUAL BACKSET DEADBOLT ASSEMBLY

Rong-Fan Wu, and Shoei-Jyi Wu, both of Chiayi Hsien, Taiwan, assignors to Posse Lock Manufacturing Co., Ltd., Chiayi, Taiwan

Filed Nov. 8, 1988, Ser. No. 268,435
Int. Cl.[5] E05C *1/16*
U.S. Cl. 292—169.14 **8 Claims**



1. A dual backseat deadbolt assembly to be used in association with a lock having a rotatable cylinder which has two axially extending crank members for actuating said deadbolt assembly to move in either one of two opposite directions, wherein said deadbolt assembly comprises:

a deadbolt housing;

a deadbolt mounted in said deadbolt housing for moving to a locking position or an unlocking position upon rotation of said lock;

an extension housing having two parallel side plates which have front ends connected to said deadbolt housing, each one of said side plates having a plurality of crank holes, said plurality of crank holes of one side plate being respectively aligned with said plurality of crank holes of the other side plate to form through-holes, each one of said through-holes establishing a different selectable backset distance of said deadbolt and being capable of receiving said crank members so that said crank members can be turned about a horizontal axis at one of said backset distances;

a transmission plate means slideably provided between said side plates, said transmission plate means having a front engaging member and a rear forked portion, said front engaging member extending into said deadbolt housing and engaging with said deadbolt;

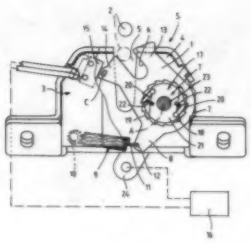
two independently movable axial strip members slideably provided between said side plates, one of said axial strip members being above said through-holes and the other said axial strip member being below said through-holes, each one of said axial strip members being connected to said rear forked portion of said transmission plate means and having a plurality of teeth extending into said through-holes, each one of said plurality of teeth being capable of engaging with one of said crank members when said lock is rotated, wherein rotation of said lock causes one of said crank members to cooperatively engage a tooth on one of said axial strip members, said axial strip members being selectable for cooperation with one of said crank members depending on which direction said lock is rotated.

4,927,196

POWER-ASSISTED ROTARY BOLT LOCK

Joël Girard, Abbeville, and Christian Wattebled, Sailly-Flibeaucourt, both of France, assignors to Vachette, Paris, France

Filed Oct. 18, 1988, Ser. No. 259,584
Claims priority, application France, Oct. 21, 1987, 87 14529; May 24, 1988, 88 06852
Int. Cl.[5] E05C *3/06*
U.S. Cl. 292—201 **19 Claims**



1. A lock device of the type used with an automobile door, lid or trunk or the like, comprising a rotary bolt means for cooperation with a keeper, motor assist means for assisting rotation of said bolt means at least during locking movement of the locking device, manual control means for operating said bolt means, said manual control means being operable in the event of failure of said motor assist means, transmission means operatively connected to said motor assist means for imparting rotation to said bolt means in a locking direction, said manual control means including an anti-locking device for preventing operation of said transmission means to thereby disengage said bolt means from said motor assist means in the event of failure of said motor assist means, said transmission means comprising a free wheel rotatably mounted adjacent said bolt means concentrically therewith and having means for rotatably driving said bolt means.

4,927,197

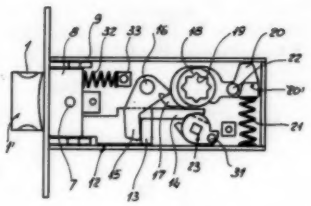
SPRING-LATCH DOOR LOCK PROVIDED WITH AN IMPROVED LOCKING SYSTEM AND ADAPTED TO BE USED FOR INWARDLY AND OUTWARDLY OPENED DOORS

Piero Predelli, via Imbonati, 17, 20129 Milano, Italy

Filed Sep. 19, 1988, Ser. No. 246,352
Claims priority, application Italy, Jul. 22, 1988, 21463 A/88
Int. Cl.[5] E05C *1/16*
U.S. Cl. 292—245 **6 Claims**

1. A spring-latch door lock provided with an improved locking system to be used both for inwardly and outwardly opened doors, comprising a spring-latch member rotatably coupled to a sliding block for assuming two fixed positions with respect to said sliding block, said sliding block being controlled by a rotary restraining member provided for restraining a lug extending from an inner face of said sliding block and driven by a lever arm operated by a handle, wherein said spring-latch member is mounted on a cylindrical rod

rotatably coupled to said sliding block and having a radial blind hole provided with at least a circumferential slot engaged



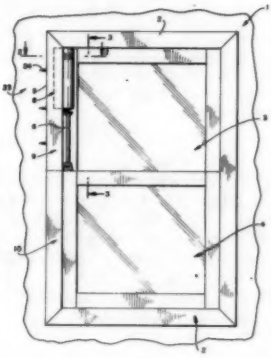
by a resilient ring member, in said radial blind hole being engaged a spring biassing a restraining pin.

4,927,198

LOCKING DEVICE FOR WINDOWS/SLIDING DOORS

Cheryl A. Fennell, 14 Barberry Ct., Largo, Md. 20772, and Kathy L. Fennell, 6504 W. Forest Rd., #201, Landover, Md. 20785

Filed Jan. 3, 1989, Ser. No. 293,061
Int. Cl.[5] E05C 17/30
U.S. Cl. 292—306 7 Claims



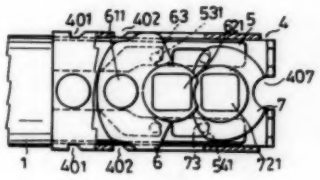
1. A locking device for windows in overlapping relationship including a vertically moveable lower window and a vertically moveable upper window that comprises an upper window frame and a lower window frame, a vertically upstanding pneumatic cylinder having an upper end and a lower end and a piston rod member at said lower end moveable with respect thereto, means pivotally securing said piston rod at its lower end to the upper end of said lower window, a first lower vertical channel frame adjacent and aligned with one side of the lower window and a second upper vertical channel frame having grooves and aligned and coextensive with said lower channel frame and adjacent said one side of the upper window, said pneumatic cylinder having laterally positioned legs forming a U-shaped member that extends longitudinally there along, the legs being adapted to be received in said grooves of said upper channel frame and secured thereto to said upper channel frame and said locking device constituting an integrated unit, a washer mounted on said rod and having a flange facing a lower end of said cylinder and means for moving said washer along said rod so as to adjustably limit movement of said piston rod with respect to said cylinder, thereby controlling movement of said lower window.

4,927,199

LATCH ASSEMBLY FOR CYLINDER LOCK

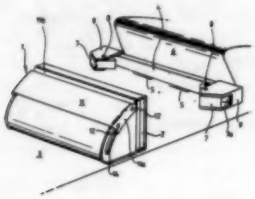
Rong-Fas Wu, and Shoei-Jyi Wu, both of No. 82, Lane 17, Ho-Mu Tsun, Chung-Pu Hsiang, Chiayi Hsien, Taiwan

Filed Sep. 23, 1988, Ser. No. 249,359
Int. Cl.[3] E05B 9/02
U.S. Cl. 292—337 3 Claims



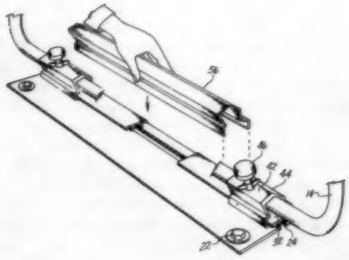
1. A dual backset latch assembly to be associated with a lock having a latch operating spindle, said latch assembly having a latch housing and an extension housing, said extension housing having two parallel side walls at least one of which has a cam guide slot means, a latch bolt provided in said latch housing for moving to a locking position or an unlocking position upon rotation of said spindle and a transmission mechanism for transmitting the movement of said latch operating spindle to said latch bolt when said lock is operated, said transmission mechanism including a first and a second cam member for rotation about two parallelly offset transverse axes which are selectable for the axis of rotation of said spindle, said first cam member having a first disc, and a substantially circular first journal boss axially projecting from said first disc, said second cam member having a second disc and a substantially circular second journal boss axially projecting from said second disc, said first and second journal bosses being inserted rotatably in said cam guide slot means and having a spindle slot for receiving said spindle, and a transmission plate to transmit the movement of said first or second cam member to said latch bolt, said latch assembly having improvements wherein both said first and second cam members are mounted on one of said parallel side walls through said cam guide slot means, the total axial length of said first cam member being greater than that of said second cam member, said first cam member being concaved radially inward to form a recess adjacent to said second cam member, said recess having an axial length smaller than said total axial length of said first cam member but greater than that of said second cam member, thereby permitting said second cam member to overlap said first cam member, said transmission plate being placed adjacent to said first and second cam members, and having a front engaging end to engage with said latch bolt, and a rear portion which has a longitudinally extending opening dividing said rear portion into two parallel strip members, said opening being aligned with said cam guide slot means, said strip members having inner sides opposite to one another, each of said strip members having a first and a second indentation adjacent to said inner sides, said first disc having two camming pins respectively extending into said first indentation of said strip members, said second disc having two camming pins extending into said second indentation of said strip members.

4,927,200
STORAGE CONTAINER AND FASTENER ASSEMBLY FOR CARS
John D. Wilkins, 75 Kenley Road, Kingston upon Thames, England (KT1 3RR)
PCT No. PCT/GB87/00543, § 371 Date Jan. 30, 1989, § 102(e) Date Jan. 30, 1989, PCT Pub. No. WO88/00895, PCT Pub. Date Feb. 11, 1988
PCT Filed Jul. 30, 1987, Ser. No. 305,726
Int. Cl.[5] B60R 7/04
U.S. Cl. 296—37.8 14 Claims



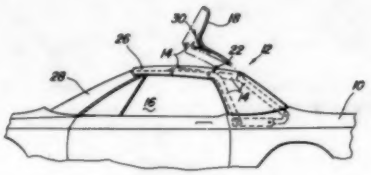
1. A storage container and a fastener assembly for detachably fixing the container to a vehicle seat, the fastener assembly being attachable to, or integral with, the vehicle seat, the container having at least a base wall, a rear wall and a pair of side walls, the base wall being adapted to engage with the floor of the vehicle in front of said seat, and the rear wall being adapted to lie adjacent to the front of said seat, wherein the fastener assembly is provided with a pair of spring-biassed clips engageable with grooves in the side walls of the container for detachably holding the container.

4,927,201
MEANS FOR RELEASABLY ANCHORING VEHICLE SEATS
Andrew Froutzis, P.O. Box 4110, Elkhart, Ind. 46514
Filed Dec. 27, 1988, Ser. No. 291,444
Int. Cl.[5] B60N 1/00
U.S. Cl. 296—63 3 Claims



3. A device for anchoring a seat to the floor of a vehicle, said seat having a pair of spaced lower horizontal supports, said device comprising a pair of generally flat base members including a raised generally T-shaped portion each having at least one substantially vertical leg and a substantially flat upper surface overlying said leg and formed in one piece therewith and to underlie and support one of said supports, a pair of anchors removably carried by the opposite ends of each base member, each anchor including an integral channel part to accommodate each support, complementary interengaging parts carried by each base member and anchor, and a fastener threaded in each anchor to engage said seat support and to shift said anchor into interlocking engagement with said base at said interengaging parts.

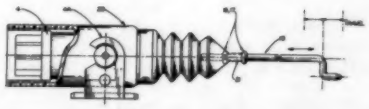
4,927,202
CONVERTIBLE TOP VINYL PUSH-OUT
Joseph M. Wagner, Manitou Beach, Mich., assignor to C & C Incorporated, Brighton, Mich.
Filed Sep. 12, 1988, Ser. No. 243,941
Int. Cl.[5] B60J 7/06
U.S. Cl. 296—107 15 Claims



1. An attachment to a retractable convertible top for a vehicle, the convertible top including a retractable support structure and a covering material attached to the support structure, said attachment comprising:

a main body having first and second ends, said first end fixedly attached to the support structure of the top and said second end slidably engaging the support structure of the top for movement therealong during retraction and extension of the top, said body engaging the covering material of the top during retraction preventing the covering material from becoming caught between components of the support structure.

4,927,203
BOOT SEALING AND ATTACHMENT MEANS FOR AUTOMOTIVE DOOR LOCK ACTUATORS AND THE LIKE
Ronald F. Mayer, Northville, and Robert Thrasher, Jr., Taylor, both of Mich., assignors to United Technologies Electro Systems, Inc., Columbus, Miss.
Filed Feb. 17, 1989, Ser. No. 312,087
Int. Cl.[5] E05B 47/00
U.S. Cl. 292—201 14 Claims



1. In a vehicular electric door locking apparatus, including

a door locking mechanism movable between locked and unlocked positions,

reversible, manually operated drive means connected to the locking mechanism for moving it between the locked and unlocked positions,

non-yielding manual means connected to the locking mechanism for moving it between the locked and unlocked positions,

electrically powered operated drive means,

a flexible boot covering over at least in part the electrically powered operated drive means to protect it from the environment, and

an axially moveable actuator rod connected to the locking mechanism for actuating it when driven by the electrically powered operated drive means and connected to one end of the boot, the improvement which comprises:

two, radially spaced, annular grooves located around the exterior surface of said rod;

the distal end portion of said boot including on its interior surface two, longitudinally spaced beads spaced at a distance less than the distance separating said two annular grooves; and

two boot retainer clips, a first one located within the interior chamber defined by said boot and a first one of said annular grooves, the second boot retainer clip being located outside of but adjacent to said boot adjacent to said second one of said beads and positioned in the second one of said annular grooves; said boot and said rod being attached together with said distal end portion of said boot being substantially affixed to said rod with respect to their relative axially positions but allowing said rod to be rotated within said distal end portion, with the beads bearing inwardly against and sliding around the exterior surface of said rod, without significantly distorting said boot.

4,927,204

DOOR OPENING/CLOSING DEVICE

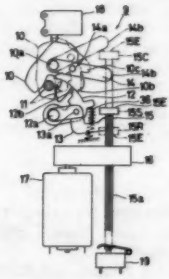
Tohru Asada, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jun. 24, 1988, Ser. No. 211,501

Claims priority, application Japan, Jun. 27, 1987, 62-160215

Int. Cl.[5] E05C *3/26*

U.S. Cl. 292—216 **6 Claims**



1. A device for latching and unlatching a door, comprising:

a striker;

a latching member rotatably mounted to the door, the latching member being rotatable to a first latch position in engagement with the striker and rotatable to a second latch position out of engagement with the striker;

a pawl rotatably mounted to the door, the pawl being rotatable between a regulatory position for holding the latching member in the first latch position and a releasing position for permitting movement of the latching member to the second latch position;

urging means for biasing the pawl to the regulatory position;

operating means operative when driven to a first operating position to rotate the latching means to the first latch position and operative when driven to a second operating position to rotate the latching means to the second latch position;

first detecting means for detecting the closing of the door;

second detecting means for detecting circumstances preparatory to opening of the door; and

controlling means responsive to the detection of the closing of the door by the first detecting means for driving the operating means to the first operating position, and responsive to the detection of circumstances preparatory to opening the door by the second detecting means for driving the operating means to the second operating position.

4,927,205

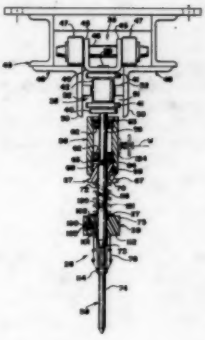
ROTATIONAL CONTAINER HOLDING DEVICE AND METHOD

Peter T. Bowler, Amherst Township, Lorain County, and Thomas J. Zeeff, Cleveland, both of Ohio, assignors to Feco Engineered Systems, Inc., Cleveland, Ohio

Continuation of Ser. No. 069,704, Jul. 2, 1987, abandoned. This application Jul. 6, 1989, Ser. No. 376,958

Int. Cl.[5] B65G *47/90*; B66C *1/54*

U.S. Cl. 294—94 **34 Claims**



1. A device for gripping and holding different sized open-ended containers, said device being adapted to engage said different sized containers at an interior surface thereof, said device further comprising a plurality of jaws arranged around an axis of said device for radial expansion and contraction, control means movable axially with respect to said jaws for controlling radial expansion and contraction of said jaws, and resilient friction means supported by said jaws and urgeable radially outwardly by said jaws for resiliently applying gripping force and friction holding force to the interior surface of a container telescoped over said jaws, said resilient means including at least one annular resilient member circumscribing said jaws, and said member being replaceable with different size resilient means for applying said gripping and friction forces to different sized open-ended containers.

4,927,206

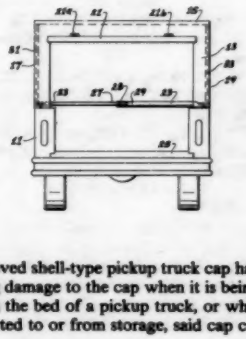
PICKUP TRUCK CAP

Clifford R. Murdock, 2392 Printup Rd., Sanborn, N.Y. 14132

Continuation-in-part of Ser. No. 206,433, Aug. 22, 1988, abandoned. This application Jun. 19, 1989, Ser. No. 367,610

Int. Cl.[5] B62D *25/00*

U.S. Cl. 296—156 **5 Claims**



1. An improved shell-type pickup truck cap having a means for preventing damage to the cap when it is being installed or removed from the bed of a pickup truck, or when said cap is being transported to or from storage, said cap comprising:

a. a substantially planar top, opposite, spacedly arranged longitudinal sidewalls and a rear wall of a substantially inverted U-shaped configuration; and

b. a rigid, elongated support bar spanning the distance between said sidewalls, said bar detachably secured to the bottom rear portions of said cap to substantially prevent lateral movement of the cap sidewalls when said bar is secured in place between said sidewalls thereby preventing damage to the upper rear portions of the cap while said cap is being installed on, removed from, or being transported to or from storage.

4,927,207

GLASS CONSTRUCTION FOR AN AUTOMOBILE

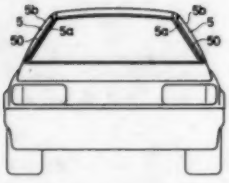
Koji Kishino, Hiroshima, Japan, assignor to Mazada Motor Corporation, Hiroshima, Japan

Filed Jan. 25, 1989, Ser. No. 303,746

Claims priority, application Japan, Jan. 25, 1988, 63-015531

Int. Cl.[5] B62D *35/00*

U.S. Cl. 296—185 **25 Claims**



1. In an automobile having a windowpane, the automobile defining a central vertical plane extending longitudinally and vertically through the automobile from a front center portion to a rear center portion of the automobile, and further defining a horizontal plane extending horizontally relative to the automobile along a bottom portion of the automobile, the improvement comprising:

said windowpane having an inner and an outer surface and a front edge and a rear edge, said inner and said outer surface each having a curvature corresponding to a portion of a surface of one of a cylindrical body and a conical body, and,

said windowpane being mounted in the automobile such that one of said front edge and said rear edge is positioned closer to the central vertical plane of the automobile relative to the other of said front edge and said rear edge, and such that a central axis of curvature defined by said curvature of said windowpane mounted in the automobile is slanted relative to the horizontal plane of the automobile.

4,927,208

SUN ROOF FOR VEHICLES

Rolf Farmont, Hurtlensenstrasse 17, 4000 Düsseldorf 30, Fed. Rep. of Germany

PCT No. PCT/EP88/00299, § 371 Date Feb. 22, 1989, § 102(e) Date Feb. 22, 1989, PCT Pub. No. WO88/08375, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 10, 1988, Ser. No. 299,360

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1987, 8706217[U]

Int. Cl.[5] B60J *7/04*

U.S. Cl. 296—216 **12 Claims**

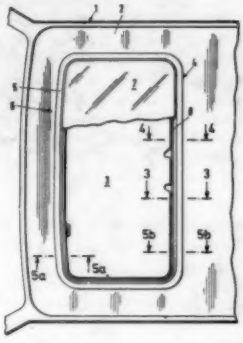
1. A sun roof to be installed in a roof opening (3) of a vehicle (1), in which a rigid lining (solid canopy 10) is located beneath the roofing (2) for receiving the sun roof (6), and comprising at least:

(a) a cover (7) which can be opened and closed and which is substantially aligned with the roofing; and

(b) a frame (4) consisting of several parts which can be clamped directly against the roofing (2) and including:

(b1) a one-piece outer frame part (5) circumscribing the roof opening (3) and which can be mounted on the roofing (2) from above, and

(b2) a one-piece inner frame part (9) circumscribing the roof opening (3), which can be rigidly joined wiht the outer frame part (5) in a zone within the roof opening (3) by means of connecting or fastening elements (16, 17, 17A, 17B) and which engages the roofing (2) from beneath, characterized in that the inner frame part (9) has a portion (a) extending under the roofing (2) in engagement therewith and designed as a flange (clamping flange 18) which can be pushed into the space between the roofing (2) and the solid canopy (10), and the solid canopy has, at least along one edge (cut surface 12) of the roof opening (3), an opening (3') identical to the roof opening (3).



4,927,209

TRIM COVER FOR USE WITH SEATS IN VEHICLES

Hidekazu Maruyama, Ayase, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan

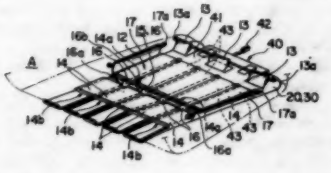
Continuation of Ser. No. 894,946, Aug. 8, 1986. This application Apr. 18, 1988, Ser. No. 185,238

Claims priority, application Japan, Aug. 9, 1985, 60-122434

The portion of the term of this patent subsequent to Jan. 12, 2005, has been disclaimed.

Int. Cl.[5] A47C *7/74*

U.S. Cl. 297—180 **6 Claims**



1. A trim cover for covering a heat cushion of a seat in a vehicle, comprising:

a surface skin;

a base cloth connected to said surface skin;

wadding sandwiched between said surface skin and said base cloth;

an electric heater comprising a plurality of band-like portions;

a plurality of elongated sack-like portions formed between

said surface skin and said base cloth, each sack-like portion being separated from adjacent sack-like portions by seams which bind said surface skin and said base cloth together, each sack-like portion receiving one of said plurality of band-like electric heater portions and having openings formed intermediate its length and extending partially across its width, said openings being aligned adjacent one another;

pulling loop means constructed by a plurality of pulling loop pieces provided at borders of each adjacent pair of sack-like portions at an intermediate portion thereof and being joined together with said surface skin and said base cloth at said borders of each adjacent pair of sack-like portions; and

a pulling wire passed under said pulling loop pieces for securing the trim cover to the seat cushion.

4,927,210

SEAT WITH AN ADJUSTABLE FOLD-DOWN BACK

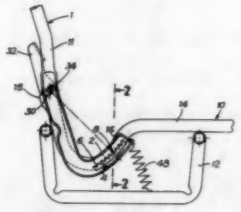
Francois Fourrey, Montbeliard, and Jean F. Maufffrey, Andelnans, both of France, assignors to ECIA - Equipements Et Composants Pour L'Industrie Aubomobile, Audincourt, France

Filed Apr. 13, 1989, Ser. No. 337,695

Claims priority, application France, Apr. 22, 1988, 88 05396

Int. Cl.[5] A47C *1/025*

U.S. Cl. 297—366 **14 Claims**



1. Seat with an adjustable fold-down back, characterized in that it comprises a backframe (1) and a sitting-surface frame (10) which are connected to one another by means of two mutually spaced axles which provide for relative movement between said backframe (1) and said sitting-surface frame (10), said two axles comprising a tilting first axle (34) and a folding-down second axle which are fixed to one of the frames (1, 10) and locked on the other frame (10, 1), and means (32) for releasing each of said two axles for the purpose of pivoting the back about the other of said two axles.

4,927,211

SAFETY HARNESS

Robert J. Boicerek, 1701 Discus Dr., Las Vegas, Nev. 89108

Filed Jul. 24, 1989, Ser. No. 383,997

Int. Cl.[5] A47D *15/00*

U.S. Cl. 297—465 **19 Claims**

1. A restraint device, comprising:

a chest pad;

a back pad;

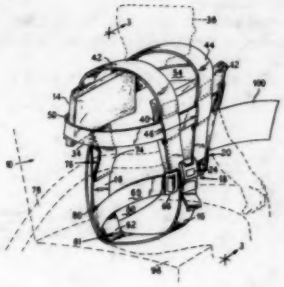
shoulder straps connectible between said pads;

a chest strap connectible between said pads;

a crotch strap connectible between said pads;

seat belt receiving means affixed to said crotch strap near a lower edge of said back pad; and

a torque strap affixed to said crotch strap at a point remote from said back pad, and buckle means attached to said back pad for cooperation with said strap to adjust the effective crotch strap length without alternating the position of attachment of a seat belt with respect to the body of a child wearer of the restraint device.



4,927,212

ROTARY ELECTRIC DRIVE DEVICE FOR ANTI-SKID BRAKING SYSTEM

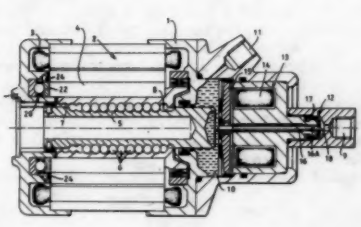
Anthony W. Harrison, Birmingham, and Philip A. Taft, Solihull, both of England, assignors to Lucas Industries, Public Limited Company, Birmingham, England

Filed Nov. 18, 1988, Ser. No. 273,072

Claims priority, application United Kingdom, Nov. 20, 1987, 8727294; Nov. 20, 1987, 8727293

Int. Cl.[5] B60T *8/32*

U.S. Cl. 303—115 **24 Claims**



1. A rotary electric device normally rotatable in two opposed directions comprising a rotary armature support means supporting the armature for rotation relative to fixed structure, and restraint means permitting free rotation of the armature in one direction of rotation, wherein said restraint means acts to cause resistance to reverse rotation, at least during a period within which the device is de-energised,

wherein said restraint means acts to lock said armature support means against reverse rotation, said support means providing a surface frictionally engaged by a surface associated with the armature in order to provide said resistance to reverse rotation of the armature during locking of said support means.

4,927,213

SLIP-CONTROLLED HYDRAULIC BRAKE SYSTEM

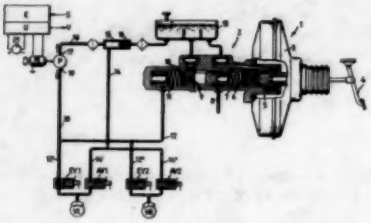
Jochen Burgdorf, Offenbach-Rumpenheim, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt Am Main, Fed. Rep. of Germany

Filed Mar. 13, 1989, Ser. No. 322,797

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1988, 3808902

Int. Cl.[5] B60T 13/70, 13/16, 8/64

U.S. Cl. 303—116 4 Claims



1. A slip-controlled hydraulic brake system for vehicles having motor driven wheels including:

a braking pressure generator, which is pressureless in a first position and which is connected to a storage reservoir;

at least one wheel brake cylinder generating a braking torque at each of the driven wheels;

a brake line connecting the braking pressure generator with the wheel brake cylinder, and a first check valve connected into said brake line;

a relief line connected to wheel brake cylinders, and a second check valve connected into said relief line; and,

a pressure medium pump having a first and a second connection, and means for delivering a pressure medium from one of said connections to the other, said first connection being connected to the relief line and said second connection being connected to the braking pressure generator, the direction of delivery of the pump being reversible so that during a brake slip control operation the pump delivers pressure medium from the first connection to the second connection and, during a traction slip control operation, the pump delivers pressure medium from the second connection to the first connection and including means for supplying fluid from said pump to the wheel brakes during said traction slip control operation, wherein the relief line and the first connection of the pump terminate in a prechamber connected to the storage reservoir by way of a non-return valve with the non-return valve being biased to prevent said pressure medium from returning into the storage reservoir, and wherein in said traction slip control operation, said pump supplies fluid to the wheel brakes by way of said prechamber and by way of actuated outlet valves.

4,927,214

OPERATING ROOM INSTRUMENT TABLE

Howard H. Kaufman, 11 Heather Dr., Morgantown, W. Va. 26505, and German Nunez, 14713 SW. 110 Ter., Miami, Fla. 33196

Filed Jun. 17, 1988, Ser. No. 208,074

Int. Cl.[5] A47B 77/00

U.S. Cl. 312—195 7 Claims

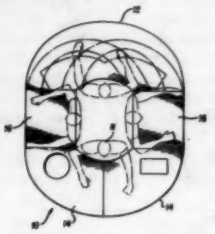
1. An operating room instrument table assembly, comprising:

(a) a plurality of modular table units;

(b) base frame for each of the table units, the base frame having vertical supports, a center connector, feet portions at the bottom of the vertical supports and wheeled castor means depending from the feet portions;

(c) a table top support frame carried by the base frame, the table top support frame having columns fitting over the base frame supports and having top portions for supporting a table top unit;

(d) a table top unit having means on the bottom surface thereof for cooperating with the table top support frame



to allow the table top unit to be fixedly supported on the support frame and to be removable therefrom;

(e) a top portion of the table top unit having indicia thereon for the placement of surgical instruments;

(f) the table top being individually removable and sterilizable as a unit with the instruments.

4,927,215

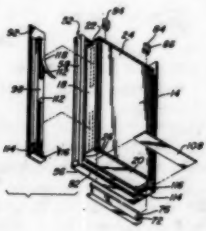
BATH CABINET MOUNTING AND FINISHING APPARATUS

Howard S. Katz, Riegelsville, Pa., assignor to Robern, Inc., Bensalem, Pa.

Filed Feb. 23, 1989, Ser. No. 314,523

Int. Cl.[5] A40B 67/00

U.S. Cl. 312—224 2 Claims



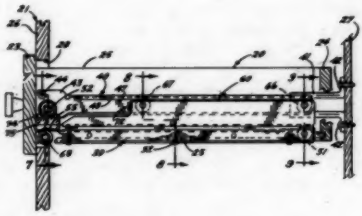
1. In combination with a surface-mounted bath cabinet having respective side, top, bottom and rear walls, a mounting bracket adapted to be secured to the surface of a wall, said mounting bracket having means thereon engagable with the cabinet to support and position the cabinet, a first channel on said mounting bracket facing away from the wall, a second channel on said cabinet facing toward the wall when the cabinet is operatively disposed, a bottom trim panel having respective longitudinal edges thereof received within said first and second channels, and a pair of side trim members coupled to said cabinet to provide finished side panels for the side walls of the cabinet, said side trim members having brackets thereon adjacent to their lower edges, said brackets having third channels thereon extending below said side walls, lateral edges of said bottom trim panel being engagable with and receivable within said third channels when said side panels are operatively disposed, and means on said side panels for securing said side panels to the side walls of the cabinet.

4,927,216

SIDE MOUNTED DRAWER SLIDE SYSTEM

John W. Bods, Roscoe, Ill., assignor to Amerock Corporation, Rockford, Ill.

Filed Jun. 26, 1989, Ser. No. 371,505
Int. Cl.[5] A47B 88/00
U.S. Cl. 312—339 10 Claims



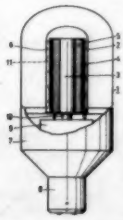
1. A system for supporting a drawer in a cabinet for back and forth horizontal movement between a fully closed position in which the rear of the drawer is located adjacent the rear of the cabinet and a fully extended open position in which the rear of the drawer is located in very close proximity to the front of the cabinet, said system comprising an elongated rail secured to the drawer and extending along one side thereof, an elongated track secured to the cabinet and spaced above said rail, and an adaptor located between said rail and said track and adapted to coact with the rail and the track to support said drawer for movement toward and away from said closed position, a first roller rotatably supported on the rear end portion of said rail and positioned to ride along said adaptor, a second roller rotatably supported on the front end portion of said adaptor and positioned to support said rail as said first roller rides along said adaptor, a third roller rotatably supported on the rear end portion of said adaptor, a fourth roller rotatably supported on said adaptor between said front and rear end portions thereof and between said second and third rollers, said third and fourth rollers beinq at the same elevation and being positioned to ride along said track, and a fifth roller rotatably supported on the front end portion of said track.

4,927,217

ELECTRODELESS LOW-PRESSURE DISCHARGE LAMP

Anthony Kroes, and Pieter G. Van Engen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jun. 8, 1988, Ser. No. 204,146
Claims priority, application Netherlands, Jun. 26, 1987, 8701496
Int. Cl.[5] H05B 41/16
U.S. Cl. 315—248 10 Claims



1. An electrodeless low-pressure discharge lamp comprising a discharge vessel sealed in a vacuum-tight manner and having a discharge space containing an ionizable vapour and a rare gas,

the discharge vessel having a protuberance protruding into the discharge space,

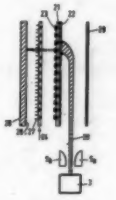
a body of soft magnetic material surrounded by an electrical coil, this body and this coil being provided in said protuberance in the discharge vessel, characterized in that the body of soft magnetic material has a heat-resistant envelope of an electrical and thermal insulator, which separates the electrical coil from said body.

4,927,218

FLAT DISPLAY TUBE COMPRISING AN EMISSION SYSTEM FOR EMITTING A PLANAR ELECTRON BEAM, A DEFLECTION SYSTEM AND A MODULATION SYSTEM

Antonius P. F. Zegers, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 6, 1989, Ser. No. 320,134
Claims priority, application Netherlands, Mar. 7, 1988, 8800554
Int. Cl.[5] H01J 29/70, 29/72
U.S. Cl. 315—366 4 Claims



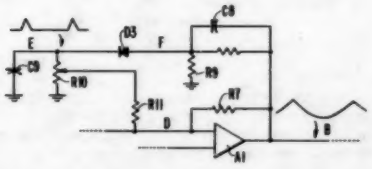
1. A flat display tube comprising an evacuated envelope which is provided with a display window, a phosphorescent display screen being present on the display window in the evacuated envelope, an emission system for emitting a planar electron beam which initially extends substantially parallel to the display screen, a modulation system for modulating the planar electron beam, which modulation system extends substantially parallel to the display screen, and a deflection system for deflecting the planar electron beam towards the modulation system, characterized in that the flat display tube comprises a selection system for selecting the electron beam in a direction transverse to the planar electron beam.

4,927,219

CORNER RASTER DISTORTION CORRECTION CIRCUIT

Stephen S. Golik, Knoxville, Tenn., assignor to North American Philips Corporation, New York, N.Y.

Filed Jun. 26, 1989, Ser. No. 371,868
Int. Cl.[5] H01J 29/56, 29/70
U.S. Cl. 315—371 5 Claims



1. A corner distortion correction circuit for correcting cor-

ner distortion in a raster display in which side pincushion correction has been effected by a diode modulator driver circuit including an operational amplifier having an output for providing an output signal of said diode modulator driver circuit, said corner distortion correction circuit comprises:

means coupled to the output of said operational amplifier for removing any DC component in the output signal thereof;

threshold means coupled to said removing means for passing only that portion of said output signal exceeding a predetermined threshold level; and

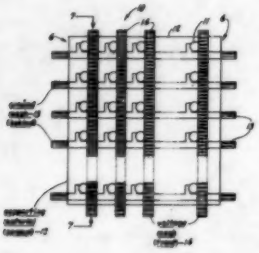
negative feedback means for negatively feeding back an output of said threshold means to an input of said operational amplifier.

4,927,220

SYSTEM AND METHOD FOR PHOTOREFRACTIVE HOLOGRAPHIC RECORDING AND SIGNAL PROCESSING

Lambertus Hesselink, Woodside, Calif., and Steve R. Redfield, Austin, Tex., assignors to Microelectronic & Computer Technology Corp., Austin, Tex.

Filed Dec. 31, 1987, Ser. No. 140,196
Int. Cl.[5] G03H *1/02*; G02F *1/05*
U.S. Cl. 350—3.64 **26 Claims**



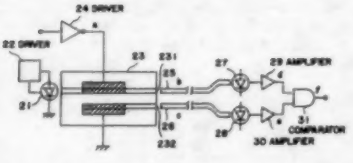
25. An optical array comprising at least two photorefractive crystallytes capable of being selectively addressed for at least one of optical signal processing or halographic recording.

4,927,221

BALANCED LIGHTWAVE TRANSMISSION SYSTEM

Mikio Kiyono, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Nov. 4, 1988, Ser. No. 267,020
Claims priority, application Japan, Nov. 7, 1987, 62-280318
Int. Cl.[5] G02B *6/10*
U.S. Cl. 350—96.14 **1 Claim**



1. A balanced lightwave transmission system comprising:

light source means for emitting a light beam;

light source driving means for driving said light source means to emit said light beam constantly;

optical directional coupling switch means having an input port optically coupled with said light source means for receiving said light beam as an input light beam and a first and a second output port for delivering a first and a second output light signal, said optical directional coupling switch means responsive to a control signal for delivering said input light beam to one of said first and second output ports as one of said first and second output light signals;

control signal generating means responsive to a digital signal to be transmitted for producing said control signal which selectively takes one of a first and a second voltage level so that said input light beam is delivered to said first output port as said first output light signal when said control signal takes said first voltage level while said input light beam is delivered to said second output port as said second output light signal when said control signal takes said second voltage level;

first and second parallel lightwave guide means having a first and a second input terminal end which are optically coupled with said first and second output ports, respectively, and having a first and a second output terminal end, respectively, for transmitting said first and second output light signals as a first and a second optical signal, respectively;

first and second photo sensing means optically coupled with said first and second output terminal ends, respectively, for converting said first and second optical signals into a first and a second electric signal, respectively; and

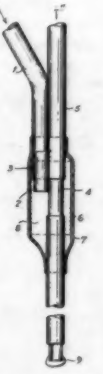
comparing means coupled with said first and second photo sensing means for comparing said first and second electric signals to reproduce said digital signal as an output electric signal of said comparing means.

4,927,222

DUAL OPTICAL FIBER DEVICE

Tadao Kamiya, Anaheim, and Matthew J. Leader, Long Beach, both of Calif., assignors to Shiley Incorporated, Irvine, Calif.

Filed Jun. 16, 1986, Ser. No. 874,927
Int. Cl.[5] G02B *6/26*
U.S. Cl. 350—96.15 **11 Claims**



1. A device for transmitting electromagnetic radiation to a radiation sensitive component, receiving output radiation from said component and transmitting said output radiation substantially unattenuated to a radiation measuring, transducing, recording or retransmitting component, which device comprises a first cladded optical fiber having a proximal end and a distal end, said proximal end being adapted to receive source radiation and said distal end having a exposed tip which touches but is not integrally joined to an exposed intermediate portion of a second cladded optical fiber having a proximal end and a distal end, the touch contact between said tip and the exposed portion of said second optical fiber forming a highly directional radiation-transmissible junction, the proximal end of said second optical fiber being adapted to be attached to a radiation

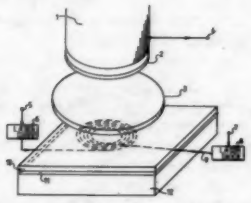
sensitive component such that the output radiation from said radiation sensitive component passes substantially unattenuated along said second optical fiber and through said junction to said radiation measuring, transducing, recording or retransmitting component, said junction being encased in a opaque, radiation reflective jacket.

4,927,223

OPTIC FIBER CORRELATOR

Jean P. Pocholle, Arpajon; Michel Papuchon, Massy; Claude Puech, Longjumeau, and Pierre Tournois, Le Rouret, all of France, assignors to Thomson-CSF, Paris, France

Filed Jul. 14, 1988, Ser. No. 218,861
Claims priority, application France, Jul. 17, 1987, 87 10120
Int. Cl.[5] G02B 6/26, 6/42
U.S. Cl. 350—96.15 **5 Claims**



1. An optic fiber correlator comprising:

a first laser and a second laser each emitting the same frequency and having an amplitude modulated respectively by a first signal and a second signal to be correlated;

an optic fiber with its two ends respectively coupled to said two lasers and having a length which is at least equal to the product of light velocity in the fiber and the maximum duration of the signals to be correlated, said optic fiber comprising, throughout its length, a part with its diameter reduced to let through an evanescent wave associated with the guided mode;

a layer of non-centrosymmetrical structure material in contact with the part having a reduced diameter, throughout the length of the fiber; and

means to collect the light emitted by said layer at a frequency which is twice the frequency of said two lasers, and to give an electric signal which is a function of the intensity of said light, said signal being an output signal of said correlator.

4,927,224

LENSLESS MULTIFIBER OUTPUT COUPLER

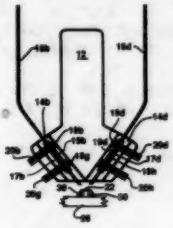
Angel L. Ortiz, Jr., and Marshall G. Jones, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 27, 1989, Ser. No. 329,137
Int. Cl.[5] G02B 6/26
U.S. Cl. 350—96.15 **11 Claims**

1. A output coupler for directly applying laser beams from a plurality of optical fibers to a workpiece, said coupler comprising:

a body means for receiving a plurality of fiber and for directly applying said laser beams to the workpiece; and

means, disposed in said body means, for adjusting the spacing and angle between the fibers, said adjusting means comprising a first screw disposed to engage a first fiber at a first position, and a first spring having first and second ends, said first spring end disposed to engaged said first



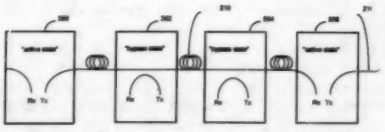
fiber opposite said first screw and said second spring end disposed to engage said body means.

4,927,225

2×2 OPTICAL BYPASS SWITCH

Frank H. Levinson, Redwood City, Calif., assignor to Finisar Corporation, Menlo Park, Calif.

Filed May 30, 1989, Ser. No. 358,892
Int. Cl.[5] G02B 6/32
U.S. Cl. 350—96.18 **12 Claims**



9. An optical fiber switch, comprising:

four optical signal ports,

an array of optical channels, including a set of four optical fibers coupled to said four optical signal ports, said four optical fibers having coplanar ends arranged in a square array; said array of optical channels further including loop back means adjacent to said square array and having two optical ports coplanar with said ends of said fibers; said loop back means including means for transmitting optical signals incident on one of said optical ports to the other of said optical ports;

a lens having two end faces, one end face abutting said coplanar ends of said set of four fibers, the other end face having mirror means for reflecting light incident thereon; and

actuator means for moving the lens between two predefined positions with respect to said array of optical channels;

said lens, when in said first position, coupling first an second ones of said optical signal ports to third and fourth ones of said optical signal ports, respectively, by reflecting optical signals from the optical fibers coupled to said first and second ones of said optical signal ports to the optical fibers coupled to said third and fourth ones of said optical signal ports;

said lens, when in said second position, coupling said first and third ones of said optical signal ports to said second and fourth ones of said optical signal ports, respectively, by reflecting optical signals from the optical fiber coupled to said first optical signal port to the optical fiber coupled to said second optical signal port, reflecting optical signals from the optical fiber coupled to said third optical signal port to a first port of said loop back means, and reflecting optical signals from the second port of said loop back means to the optical fiber coupled to said fourth optical signal port;

whereby two distinct optical connections are made when

said optical fiber switch is in said first and second positions.

4,927,226

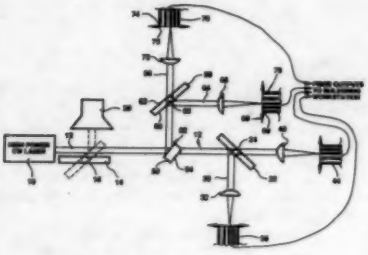
MULTIPLEXER FOR HIGH POWER CW LASERS

Angel L. Ortiz, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 27, 1989, Ser. No. 329,160

Int. Cl.[5] G02B 6/32; B23K 9/00

U.S. Cl. 455—611 **16 Claims**



1. Apparatus for multiplexing a coherent high power continuous wave laser beam having a first path, said apparatus comprising:

means for interrupting the propagation of said light beam along the first path;

deflection means, disposed in the first path after said interruption means, for changing the direction of at least a portion of said laser beam to a second path, said deflection means changing the direction of said first path only when said interruption means is interrupting the propagation of said laser beam;

first focussing means disposed in said second path and having a first focus plane; and

a first plurality of means for transmitting laser beams, each of said plurality of means having an input end disposed in said first focus plane.

4,927,227

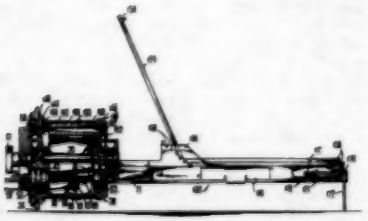
OPTICAL FIBER CABLE CLOSURE

William H. Bensel, III, Lawrenceville; Robert H. Gladden, Jr., Norcross; John F. Malluck, Marietta; Robert R. Ross, Gainsville, and Andrew H. Williamson, Jr., Doraville, all of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 31, 1988, Ser. No. 264,606

Int. Cl.[5] G02B 6/36, 7/26

U.S. Cl. 350—96.20 **22 Claims**



1. An optical fiber cable closure, said closure comprising:

a cover having a closed end and an open end; and a cable splicing termination assembly which is adapted to become disposed within said cover, said cable splicing termination assembly including:

cable entry means through which cables to be spliced are routed into said closure;

support means which extends from said cable entry means and which has a free end adapted to be disposed adjacent to said closed end of said cover, said support means including a plurality of pairs of opposing, aligned pins which pins are staggered in a stepped manner and in a direction from said cable entry means to a free end of said support means;

at least one tray which is mounted pivotally on said support means for holding spliced portions of optical fibers, each of said trays cooperating with an associated pair of said pins forming partially a hinge and including means for holding spliced portions of fibers;

hinge lock plate means removably attached to one end of said at least one tray for completing said hinge means for each said tray and being removable to permit optical fibers from at least one entering cable to be routed into each said tray, said hinge lock plate means also cooperating with a portion of said at least one tray to prevent unintended movement of optical fibers at an entrance to said at least one tray.

4,927,228

OPTOELECTRONIC ARRANGEMENT HAVING A COUPLING BETWEEN AN OPTICAL TRANSMISSION FIBRE AND A SEMICONDUCTOR LASER DIODE

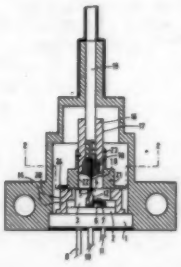
Hermanus A. Van De Pas, Nijmegen, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed May 31, 1989, Ser. No. 359,464

Claims priority, application Netherlands, Jun. 6, 1988, 8801443

Int. Cl.[5] G02B 6/36

U.S. Cl. 350—96.20 **4 Claims**



1. An arrangement for coupling an optical transmission fiber with a laser diode comprising:

a holder for said optical fiber;

a holder for said laser diode;

an intermediate part disposed between said holder for said optical fiber and said holder for said laser diode, one of said two holders and said intermediate part being insertable within one another and having an annular connection part of reduced thickness to permit axial adjustment of one of two said holders and said intermediate part and fixation of same by welding, the other of said holders and said intermediate part having confronting flat surfaces extending traversely to the longitudinal axis of said holder and said intermediate part, one of said confronting surfaces having a flange of reduced thickness to permit welded fixation of said other holder and said intermediate part after transverse adjustment thereof to permit axial and transverse alignment of said optical fiber and said laser diode.

4,927,229

OPTICAL CABLE COUPLING ADAPTER

Yoshiyasu Tanaka, Yokohama; Toshimi Nagaishi, and Mituyoshi Suzuki, both of Machida, all of Japan, assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 6, 1989, Ser. No. 293,975
Int. Cl.[5] G02B 6/38
U.S. Cl. 350—96.21 6 Claims

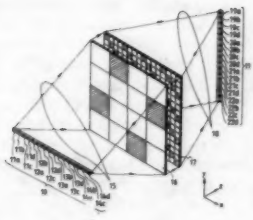
1. An optical cable coupling adapter comprising two end portions each holding a plurality of cylindrical rods with their outer circumferences kept in contact with one another, the cylindrical rods in each end portion defining a passage for an optical fiber, and a single piece nearly polygonal split sleeve adapted to make contact with the exposed outer circumferential surfaces of the cylindrical rods and effect center alignment of the fiber passages in the two end portions.

4,927,230

OPTICAL SWITCH ARRAY PROVIDED WITH A MASK HAVING OPENINGS OF A PREDETERMINED PATTERN AND SHUTTERS CORRESPONDING TO THE PATTERN

Jun Tokumitsu, Sagamihara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 11, 1988, Ser. No. 231,004
Claims priority, application Japan, Aug. 19, 1987, 62-206038
Int. Cl.[5] G02B 6/04
U.S. Cl. 350—96.24 14 Claims



1. An optical switch array comprising:

N light-emitting means arranged in a predetermined direction and each emitting a light independently modulated in accordance with an input signal, wherein N is an integer greater than 1;

masking means having N×M segments arranged in the form of a matrix in said predetermined direction and in a direction perpendicular thereto, some of said segments performing one of transmitting the lights emitted from said light-emitting means therethrough and reflecting the lights emitted from said light-emitting means, said masking means having repetitively formed thereon a predetermined pattern comprising at least two of said segments as a unit, wherein M is an integer greater than 1;

M light-receiving means arranged in a direction perpendicular to said predetermined direction, for receiving the lights transmitted through or reflected by said masking means and independently outputting signals; and

shutter means comprising shutters disposed in the optical path from said light-emitting means to said light-receiving means and arbitrarily openable-closable at each segment unit constituting the pattern of said masking means.

4,927,231

LIQUID FILLED FLEXIBLE DISTAL TIP LIGHT GUIDE

Jeffrey I. Levatter, San Diego, Calif., assignor to Acculase Inc., San Diego, Calif.

Continuation of Ser. No. 146,430, Jan. 21, 1988, abandoned. This application Feb. 27, 1989, Ser. No. 282,932
Int. Cl.[5] G02B 6/20
U.S. Cl. 350—96.32 15 Claims

1. An elongated light guide assembly for a high-power laser beam, comprising:

an optical fiber having a solid core for transmitting a high-power laser beam, the optical fiber extending over a substantial majority of the elongated light guide assembly's length; and

a liquid-filled flexible tube optically coupled to one end of the optical fiber, for transmitting the high-power laser beam transmitted to it by the optical fiber, wherein the liquid-filled flexible tube is substantially more flexible than is the optical fiber.

4,927,232

STRUCTURAL MONITORING SYSTEM USING FIBER OPTICS

Richard W. Griffiths, Pacific Palisades, Calif., assignor to G2 Systems Corporation, Pacific Palisades, Calif.

Continuation-in-part of Ser. No. 32,042, Mar. 27, 1987, Pat. No. 4,812,645, which is a continuation-in-part of Ser. No. 712,889, Mar. 18, 1985, Pat. No. 4,564,520, which is a continuation-in-part of Ser. No. 571,304, Jan. 16, 1984, abandoned, which is a continuation of Ser. No. 295,600, Aug. 24, 1981, abandoned. This application Mar. 13, 1989, Ser. No. 323,498
Int. Cl.[5] G02B 6/16
U.S. Cl. 350—96.29 7 Claims

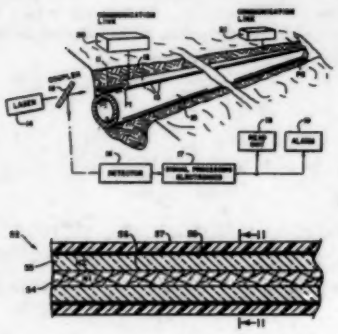
1. An optical fiber sensor cable, comprising:

a core;

a cladding surrounding said core and having an index of refraction different from the index of refraction of said core; and

a coating surrounding said cladding, said coating including a particulate material in intimate engagement with said

cladding, said particulate material being movable radially toward and away from said cladding to distort the homogeneity of at least a portion of said cladding to change the index of refraction thereof.



4,927,233

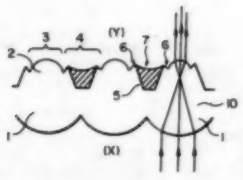
REAR PROJECTION SCREEN

Yasuaki Nakanishi, Zama, and Masao Inoue, Tokyo, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Japan

Filed Mar. 6, 1989, Ser. No. 319,629

Int. Cl.[5] G03B 21/60

U.S. Cl. 350—128 6 Claims



1. In a rear projection screen having an incidence surface upon which projection light rays impinge, and a viewing surface on which a projected image is visible, comprising lenticular lenses formed on said incidence surface for focusing the projection light rays on said viewing surface within light focusing areas other than no-light focusing areas, lenticular lenses formed on said viewing surface in said light focusing areas; and ambient light absorbing layers formed on said viewing surface in said no-light focusing areas, the improvement wherein each of said no-light focusing areas is formed therein with an ink filling groove and has ridges on both sides of the groove, each of said ridges having top edge, ink is filled in said groove in each no-light focusing area so as to form each of said ambient light absorbing layers having both side edges reaching the top edges of said ridges, whereby the both side edges of each of said light absorbing layers define straight border lines extending therealong.

4,927,234

OPTICAL SYSTEM FOR HEAD-UP DISPLAYS

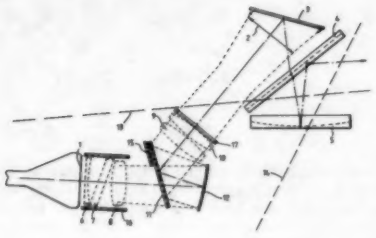
John R. Banbury, Fleet, and Derek L. Barter, Aldershot, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, United Kingdom

Filed Aug. 12, 1988, Ser. No. 231,448

Claims priority, application United Kingdom, Aug. 21, 1987, 8719854

Int. Cl.[5] G02B 27/10

U.S. Cl. 350—174 7 Claims



1. An optical system for a head-up display having a collimator for producing a collimated image of one or more display objects and including an optical relay unit for producing an intermediate image of each display object in the focal plane of the collimator, the optical relay unit comprising:

a first group of relay elements for each display object;

a second group of relay elements for receiving light from each of the first groups of relay elements and focusing said light in the focal plane of the collimator;

and a plurality of optical folding elements for producing a double fold in the optical path between said first and second groups of relay elements, the folding elements comprising one or more first folding elements one for each display object for reflecting light from the display object to a second folding element;

said second folding element positioned to reflect light incident on it at a defined combination of angle of incidence and wavelength, and to transmit display light incident on it at a different combination of angle of incidence and wavelength, and being so disposed that light from at least one display object passes through the second folding element before being reflected by the first folding element to impinge on the second folding element at a different angle of incidence and is hence reflected towards the second group of relay elements.

4,927,235

MOVABLE-MEMBER SUPPORTING APPARATUS

Ichiro Narumi, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Continuation of Ser. No. 154,412, Feb. 10, 1988, abandoned. This application Sep. 26, 1989, Ser. No. 412,615

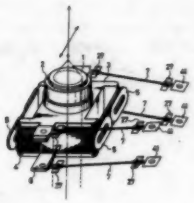
Claims priority, application Japan, Feb. 10, 1987, 62-28748

Int. Cl.[5] G02B 7/04; G11B 7/00

U.S. Cl. 350—252 5 Claims

1. A movable-member supporting apparatus, comprising: a first end portion fixed to a movable member; a second end portion adapted to be fixed to a fixed member; a connecting portion for connecting said first and second end portions to each other; a first flexible portion provided at a portion of said connecting portion in the vicinity of one of said first and second end portions and arranged so as to be independently flexible in the longitudinal direction of said connecting portion and

at least in one direction substantially perpendicular to said longitudinal direction; and a first vibration-suppressing member attached to said first flexible portion for suppressing vibrations of said flexible member.



4,927,236

NON-SELF SUPPORTING OPTICAL DEVICE WITH SUPPORT STRUCTURE

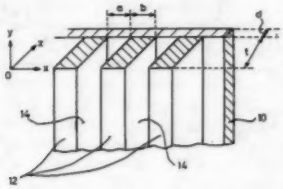
Fritz Keilmann, Stuttgart, Fed. Rep. of Germany, assignor to Max Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Fed. Rep. of Germany

Filed Mar. 10, 1988, Ser. No. 166,221

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1987, 3707983

Int. Cl.[5] G02B *5/30*

U.S. Cl. 350—276 R **11 Claims**



1. An optical arrangement comprising

an optically effective arrangement (**10**) which has predetermined planar dimensions as well as a slight thickness (d) which alone is not sufficiently stable mechanically and which is designed for the transmission of optical radiation of a predetermined wave length region, and

supporting arrangement which is substantially transparent for the radiation and which is coupled with the optically effective arrangement for the mechanical stabilization thereof,

characterized in that

the supporting arrangement comprises at least one group of spaced webs or lamellae (**12**) made from metal, the maximal wavelength of the predetermined wave length region and

the lamellae (**12**) have a width (b) and such spacing (a) with respect to each other, that the sum (a+b) of a lamellae width and of a lamellae length is smaller than the smallest effective wavelength of the wavelength region, wherein in the case of a vertical beam incidence, the effective wave length is equal to the smallest wavelength of the wavelength region and, in case of a radiation incidence under an angle α (for example in the z-y plane) the effective wavelength is equal to the minimum wave length divided by (1-sin α).

4,927,237

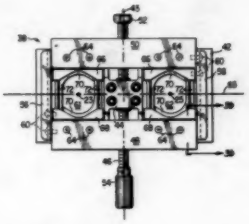
UNIVERSAL NIGHT VISION GOGGLE ADAPTER

Richard T. Hart, Garland, Tex., assignor to Varo, Inc., Garland, Tex.

Filed Jun. 7, 1988, Ser. No. 203,496

Int. Cl.[5] G02B *7/02*

U.S. Cl. 350—319 **17 Claims**



9. A universal night vision goggle adapter for use with a Special Purpose Test Set, comprising:

first and second parallel bars arranged symmetrically on either side of optical axes of the test set;

a first pair of generally c-shaped clamping portions fixed to said first bar in a spaced relationship to each other and correspondingly centrally facing said optical axes;

a second pair of generally c-shaped clamping portions fixed to said second bar in a spaced relationship to each other and symmetric to the first pair of clamping portions with respect to said optical axes and slidably engageable therewith

a bearing housing disposed between said first pair of clamping portions and said first and second parallel bars;

a rod with right hand threads on one end and left hand threads on another end, said rod passing through and rotatably supported by said bearing housing, and threadably attached to said first and second parallel bars; and

a platform having holes passing therethrough, said holes having axes coincident with said optical axes of the test set, said bearing housing being fixed to said platform in order to allow said rod to rotate within said housing to move said parallel bars and adjust each of said first and second pairs of clamping portions around a night vision goggle to allow testing thereof.

4,927,238

METHOD AND APPARATUS FOR DISPLAYING A THREE DIMENSIONAL VISUAL IMAGE

James A. Green, Mars, Pa., and Nicholas C. Terzis, 1507 Merrick Ave., Pittsburgh, Pa. 15226, assignors to Nicholas C. Terzis, Pittsburgh, Pa.

Continuation of Ser. No. 675,275, Nov. 27, 1984, abandoned. This application Sep. 30, 1988, Ser. No. 253,315

Int. Cl.[5] G02B *27/22*; G03B *21/32*

U.S. Cl. 350—130 **17 Claims**

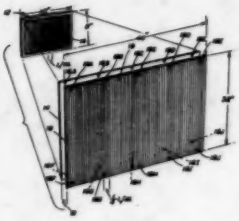
1. A photographic transparency display for depicting a three dimensional visual image comprising:

supporting frame means for displaying a photographic image which defines a height, a width, a first side and a second side;

a viewing screen extending substantially along said height and width of said first side of said supporting frame means with said viewing screen generated by exposing photographic film to light which has passed through a lenticular screen thereby generating a plurality of substantially parallel lines which are of a predetermined width and separated by clear spaces;

a transparency having a photographic image disposed thereon and extending substantially along said height and width of said second side of said supporting frame means

and spaced from said first side by a predetermined distance with said photographic image including a plurality of substantially parallel image segments generated by exposing said transparency to light which has passed through said lenticular screen, said image segments having



a predetermined width corresponding to the width of said lines on said viewing screen and being in fixed alignment and registration with said lines on said viewing screen;

wherein a three dimensional visual image of said photographic image results when viewing said photographic image through said viewing screen.

4,927,239

ANTI-REFLECTION FILM FOR AN OPTICAL ELEMENT CONSISTING OF AN ORGANIC MATERIAL

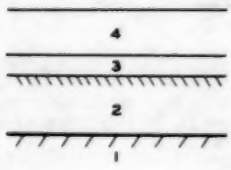
Manfred Metzig, Wessling; Horst Rösler, both of Wessling, and Medardus Schöbl, Landsberied, all of Fed. Rep. of Germany, assignors to Optische Werke G. Rodenstock, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 240,480, Sep. 6, 1988, abandoned, which is a continuation of Ser. No. 119,237, Sep. 25, 1987, which is a continuation of Ser. No. 740,920, Jul. 11, 1985, abandoned. This application Jan. 23, 1989, Ser. No. 300,192

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1983, 3332872

Int. Cl.[5] G02B *1/10*

U.S. Cl. 350—165 **4 Claims**



1. An anti-reflection film for a clearly transparent optical element (1) of organic material, the film consisting substantially of a multi-layered body wherein a first layer (2) is deposited directly on the optical element, the first layer being comprised of SiO_2 with a thickness in the range of from 0.1 μm to 5 μm, a middle or second layer (3) comprising of at least one from the group consisting of dysprosium oxide (D_2O_3), erbium oxide (Er_2O_3), europium oxide (Eu_2O_3), holmium oxide (Ho_2O_3), neodymium oxide Nd_2O_3), samarium oxide (Sm_2O_3), terbium oxide (Tb_4O_7), ytterbium oxide (Yb_2O_3) and yttrium oxide (Y_2O_3), neodymium oxide (Nd_2O_3), samarium oxide (Sm_2O_3), the middle layer (3) having a thickness less than $\lambda/10$ and an upper layer (4) comprised of SiO_2 and having a thickness of $\lambda/4$, where λ is the "center-of-gravity" wavelength of the incident light.

4,927,240

MULTIPLE LIQUID CRYSTAL DISPLAY

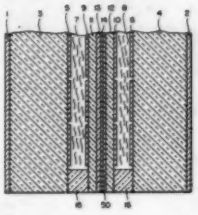
Michael Stolov, and Adi Stolov, both of 25 Hapoel Street, Nof-Yam, Israel

Continuation of Ser. No. 797,464, Nov. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 552,379, Nov. 16, 1983, Pat. No. 4,580,876. This application Aug. 25, 1988, Ser. No. 236,293

Claims priority, application Israel, Nov. 2, 1983, 70115

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—335 **8 Claims**



1. A multilayer liquid crystal display providing high contrast, said multilayer liquid crystal display, comprising the sequence of:

a first polarizer applied to one surface of a first glass plate, said first glass plate having on a second surface a first transparent electrode,

a first liquid crystal layer of the sort which twists the plane of polarization applied with one of its surfaces to said first transparent electrode and with the second surface to a second transparent electrode disposed on one surface of a second glass plate, said second glass plate applied with the second surface to one surface of a second polarizer, said second polarizer applied with the second surface to one surface of a third glass plate, said third glass plate having on a second surface a third transparent electrode, and

a second liquid crystal layer of the sort which twists the plane of polarization, applied with one surface to said third transparent electrode and with the second surface to one surface of a fourth transparent electrode disposed on one surface of a fourth glass plate, having on the second surface a third polarizer, wherein said first liquid crystal layer and said second liquid crystal layer can be energized simultaneously causing high contrast compared with a single cell liquid crystal display.

4,927,241

OPTICAL IMAGING SYSTEM HAVING AN ELECTRONICALLY VARIABLE FOCAL LENGTH AND OPTICAL IMAGE SENSOR PROVIDED WITH SUCH A SYSTEM

Karel E. Kuijk, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 78,334, Jul. 27, 1987, abandoned. This application Sep. 25, 1989, Ser. No. 411,792

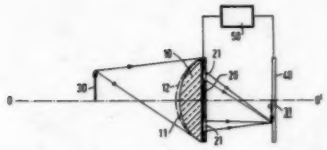
Claims priority, application Netherlands, Aug. 25, 1986, 8602149

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—336 **7 Claims**

1. An optical imaging system having an electronically variable focal length, comprising a system of lenses and a liquid crystal layer, characterized in that the system of lenses is divided into a plurality of sectors having different, constant focal lengths and in that the liquid crystal layer forms part of an

electronically variable diaphragm including at least first and second terminals disposed on the surface of said layer for selecting sectors of the system of lenses and hence selecting a focal length.



4,927,242

DUAL FREQUENCY, OPTICALLY ACTIVE LIQUID CRYSTAL CELL

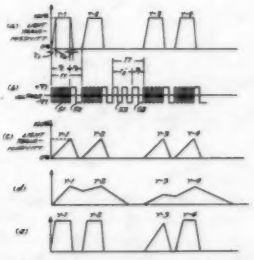
Kenji Aoki; Mitsuo Nagata; Haruo Nakamura, and Teiji Miura, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

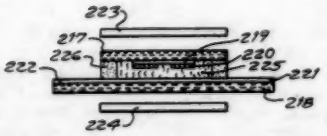
Continuation of Ser. No. 309,521, Oct. 7, 1981, abandoned. This application Jun. 10, 1985, Ser. No. 742,651

Claims priority, application Japan, Oct. 8, 1980, 55-141085; Jun. 19, 1981, 56-95091

Int. Cl.[5] G02F 1/13

U.S. Cl. 350—346 **16 Claims**





1. A liquid crystal optical device comprising a liquid crystal panel including two opposed transparent base plates, each having at least one electrode disposed thereon, and a liquid crystal material sealed between the two base plates, said liquid crystal material having a dielectric anisoptropy which becomes zero at a crossing frequency ("fc") of 100 KHz or below at working temperatures, the dielectric anisotropy which being positive at frequencies lower than fc ("fl") and negative at frequencies higher than fc ("fh"), and a liquid crystal driving circuit for selectively applying signals of frequency fh and fl during successively repeating writing periods, T_1, T_1 including a first signals applying period T_2 and a second signal applying period T_3, such that $T_1=T_2+T_3$, wherein the driving circuit selectively applies in T_2 a signal fl or a signal fh for placing the panel in one of the OFF or ON states, the liquid crystal material aligned parallel with an electric field or inclined with an electric field or inclined with respect to the electric field, and applies in T_3 a signal for placing the liquid crystal material in an initial driving state aligned with the electric field.

4,927,243

METHOD AND APPARATUS FOR DRIVING OPTICAL MODULATION DEVICE

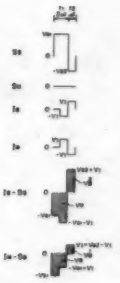
Osamu Taniguchi, Chigasaki; Yoshihiro Onitsuka, Yokohama, and Tadashi Mihara, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 3, 1987, Ser. No. 116,244

Claims priority, application Japan, Nov. 4, 1986, 61-262460

Int. Cl.[5] G02F 1/13

U.S. Cl. 350—350 S **15 Claims**



1. A driving method for an optical modulation device comprising a plurality of scanning lines and a plurality of data lines intersecting with the scanning lines to form a matrix of pixels each formed at an intersection of the scanning lines and the data lines, each pixel assuming either a first optical state or a second optical state depending on the direction of an electric field applied thereto; said driving method comprising:

applying a scanning selection signal to a scanning line to select the scanning line in a scanning selection period including a former phase and a latter phase having a duration smaller than that of the former phase, said scanning selection signal having a voltage of one polarity at the former phase and a voltage of the other polarity at the latter phase wherein the time duration of the applied voltage of one polarity at the former phase is longer than the time duration of the applied voltage of the other polarity at the latter phase; and

applying a data signal to data lines in synchronism with the scanning selection signal, said data signal having a voltage of zero at a part of the former phase, a voltage of one or the other polarity at another part of the former phase, and a voltage of a polarity opposite to said one or the other polarity at the latter phase, with said voltages of zero, and one and the other polarities being defined with respect to the voltage level of a non-selected scanning line, so as to apply to all or a prescribed part of the pixels on the selected scanning line a voltage of one polarity providing the first optical state to all or a prescribed part of the pixels

at the former phase, apply to a selected pixel among all or a prescribed part of the pixels a voltage of the other polarity providing the second optical state, and to the remaining pixels a voltage not changing an optical state at the latter phase, and apply to the pixels on a non-selected scanning line a voltage not changing an optical state and having an average value of zero.

4,927,244

USE OF COMPOUNDS OR MIXTURES OF COMPOUNDS WHICH HAVE A CHIRAL, ORTHOGONAL, MORE HIGHLY ORDERED SMECTIC PHASE IN THE RANGE OF SAID PHASE AS SWITCHING OR INDICATING MEDIUM

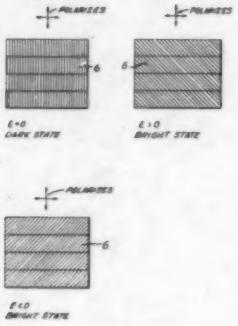
Christian Bahr; Gerd Heppke; Detlef Lötzsch, all of Berlin; Hans-Rolf Dübal, Königstein; Claus Escher, Mühltal, and Dieter Ohlendorf, Liederbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 5, 1988, Ser. No. 177,685

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1987, 3711360; May 29, 1987, 3718174

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—350 S **3 Claims**



1. A switching or indicating component which is based on the electroclinic effect, comprising as switching or indicating medium a compound or a mixture of compounds which are present in a chiral, orthogonal, more highly ordered smectic phase in the operational state of the switching or indicating component.

4,927,245

FREQUENCY SHIFTER FOR MEDIUM INFRARED RANGE WAVE

Michel Papuchon, Massy; Jean-Paul Pocholle, Arpajon, and Dominique Delacourt, Paris, all of France, assignors to Thomson-CSF, Paris, France

Filed Aug. 30, 1988, Ser. No. 238,123

Claims priority, application France, Sep. 1, 1987, 87 12156

Int. Cl.[5] G02B *5/18, 6/34;* G02F *1/23*

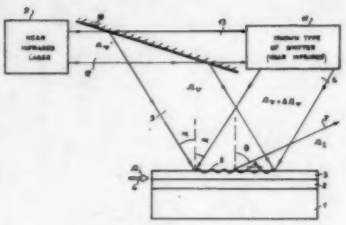
U.S. Cl. 350—354 **2 Claims**

1. A frequency shifter for waves in the medium infrared range, comprising:

a diffraction grating in motion to shift, by Doppler effect, the frequency of a wave applied to this grating;

an optic guide, in which is guided the wave which has to undergo the frequency shift, formed by semiconducting materials and on the surface of which the diffraction grating is created by carriers photo-induced by periodic illumination; and

means to produce two wave beams and to make them interfere on the surface of the guide, said wave beams having different frequencies, belonging to the near or visible



infrared range, to produce said periodic illumination in translational motion on the surface of the guide.

4,927,246

PLANAR ELECTROCHROMIC DIMMER

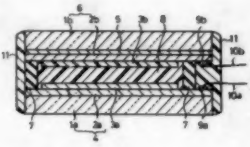
Toshiyasu Ito; Jun Minours; Shigeyuki Takahashi; Takaaki Mori; Mamoru Kato, and Toshikazu Funahashi, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Aug. 12, 1988, Ser. No. 231,470

Claims priority, application Japan, Aug. 13, 1987, 62-124153[U]

Int. Cl.[5] G02F *1/17*

U.S. Cl. 350—357 **7 Claims**



1. A planar electrochromic dimmer comprising:

first and second electrode-equipped bases, each including a transparent electrode film provided thereon, the bases being arranged such that the transparent electrode films face each other,

an electrolyte provided between the electrode-equipped bases,

a color-forming layer provided on at least one of said electrode-equipped bases, and

a thin metal film with a visible ray transmittivity of 20–60% provided between said at least one color forming layer and its respective transparent electrode film, the metal film and the transparent electrode set functioning together as electrodes.

4,927,247

OBJECTIVE LENS FOR OPTICAL DISK SYSTEM AND OPTICAL HEAD USING THE SAME

Yasuhiro Tanaka, Ashiya; Masaaki Sunohara, Nishinomiya; Yasuo Nakajima, Ibaraki, and Shinichi Tanaka, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

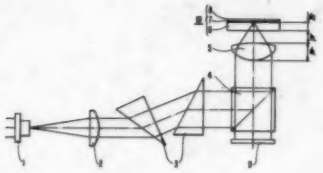
Filed Apr. 26, 1989, Ser. No. 343,256

Int. Cl.[5] G02B *13/18*

U.S. Cl. 350—432 **7 Claims**

1. An objective lens for an optical disk system, having opposite first and second aspherical surfaces each providing a positive refractive power for focusing a light to form a light spot

through a transparent plate, and satisfying substantially the following condition:



$$\left|\frac{f_L}{\nu_L}-\frac{n_c-1}{{n_c}^2}\cdot\frac{d_c}{\nu_c}\right|<\frac{\lambda}{3NA^2}$$

where,

f_L: focal length of the lens,

d_c: thickness of the transparent plate,

n_c: refractive index of the transparent plate,

λ: center wavelength of the light,

NA: numerical appertures of the lens,

ν_L: local dispersion of the lens, and

ν_c: local dispersion of the transparent plate, the local dispersion being expressed by:

$$\nu=-\frac{n_\lambda-1}{n_{\lambda+5}-n_{\lambda-5}}$$

where n_λ is a refractive index at a center wavelength λ of the light, $n_{\lambda+5}$ is a refractive index at a wavelength 5 nm longer than the center wavelength of the light, and $n_{\lambda-5}$ is a refractive index at a wavelength 5 nm shorter than the center wavelength of the light.

4,927,248

VEHICLE LAMP LENS HAVING FRESNEL LENS

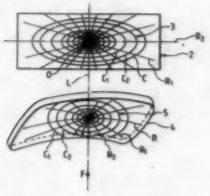
Koichi Sakakibara, and Yasuo Ozawa, both of Shizuoka, Japan, assignors to Koito Manufacturing Co., Ltd., Tokyo, Japan

Filed Apr. 7, 1989, Ser. No. 334,620

Claims priority, application Japan, Apr. 8, 1988, 63-46856; Apr. 11, 1988, 63-89645; Apr. 13, 1988, 63-89128; Sep. 7, 1988, 63-223968

Int. Cl.[5] G02B *3/08*

U.S. Cl. 350—452 **10 Claims**



1. A vehicle lamp lens, comprising: an elliptic Fresnel lens area wherein concentric elliptic pitch baselines are arranged at a suitable pitch on a surface of a lens member; said elliptic pitch baselines being circumferentially divided by a number of radial division lines passing through the center of said elliptic pitch baselines to thereby demarcate a number of elliptically-arcuate Fresnel step design sections; Fresnel steps of an angular shape and having inclined surfaces formed respectively at said Fresnel step design sections; the angle of the angular shape as well as the inclined surfaces of the Fresnel step being determined such that light transmitted from a focus on the reverse side of the lens to the respective Fresnel step design sections will pass through respective prisms so as to form substantially parallel outgoing beams, said Fresnel steps of angular shape being disposed continuously along said elliptic pitch baselines in juxtaposed relation.

4,927,249

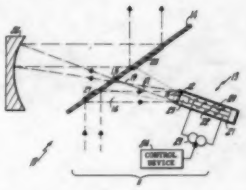
ELECTROMECHANICAL LIGHT CHOPPER ARRANGEMENT

George R. Wisner, Deep River, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 23, 1988, Ser. No. 289,109

Int. Cl.[5] G02B *26/00*

U.S. Cl. 350—486 **9 Claims**



1. An arrangement for chopping a collimated beam of light traveling in an initial path, comprising

means for reflecting the light of said beam, including a flexible mirror which reflects substantially all of said light from said initial path into an auxiliary path in a first configuration thereof;

means for deforming said flexible mirror from said first configuration to a second configuration in which said flexible mirror disperses said light such that all but a minute fraction of the so dispersed light propagates outside said auxiliary path; and

means for blocking further propagation along said auxiliary path of that of said light that is reflected by said flexible mirror to the outside of said auxiliary path.

4,927,250

OPTICAL SYSTEM FOR COMPENSATING CHROMATIC ABHERRATION OF IMAGE

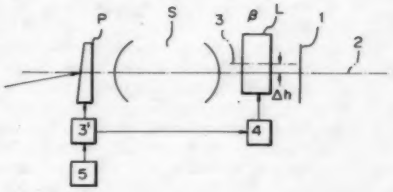
Shigeyuki Suda, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 844,383, Mar. 26, 1986, abandoned. This application Aug. 16, 1988, Ser. No. 232,533

Claims priority, application Japan, Mar. 29, 1985, 60-65467

Int. Cl.[5] G02B *27/64*

U.S. Cl. 350—500 **11 Claims**



8. An optical system for stabilizing an image formed by an objective lens by an image deflector of a variable angle, comprising:

an optical unit being arranged at an image plane side of said objective lens and comprising a plurality of optical elements having different dispersions for suppressing an

aberration of the image due to the refraction by said deflector,

said optical unit being displaced substantially in the direction perpendicular to an optical axis of the objective lens in accordance with the refraction angle of said deflector.

4,927,251

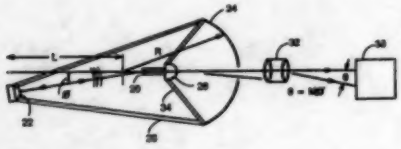
SINGLE PASS PHASE CONJUGATE ABERRATION CORRECTING IMAGING TELESCOPE

Neil C. Schoen, 9817 Freestate Pl., Gaithersburg, Md. 20879

Filed Jun. 13, 1988, Ser. No. 205,926

Int. Cl.[5] G02B *23/06*

U.S. Cl. 350—503 **8 Claims**



1. An aberration correction imaging device, in which an object beam of electromagnetic radiation and an aberration-sampling reference beam both make a single pass through the aberrations present in said device and interact with an unaberrated reference beam in a phase conjugating medium, producing as output an unaberrated image beam, said device comprising: said phase conjugating medium; means for producing reference beams; means for receiving the incident object beam and the aberration-sampling reference beam onto optical components having aberrations; means for directing the resulting aberrated object beam, the aberration-sampling reference beam and the unaberrated reference beam onto said phase conjugating medium to thereby produce the output unaberrated image beam, and means for separating the unaberrated image beam from the aberration-sampling reference beam and the unaberrated reference beam, said means for separating utilizing differences in angular direction, polarization, or wavelength between the unaberrated output image beam from the reference beams.

4,927,252

NEWTONIAN TELESCOPE ASSEMBLY WITH ROTARY FLAT MIRROR

James D. Burr, 1960 Jefferson Rd., No. 23, Evergreen, Colo. 80439

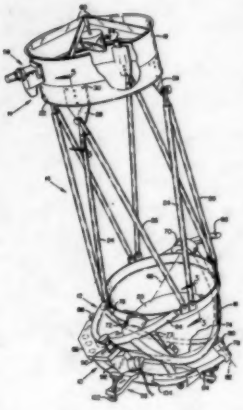
Filed Apr. 12, 1989, Ser. No. 336,870

Int. Cl.[5] G02B *23/06, 23/16, 7/18, 17/06*

U.S. Cl. 350—503 **5 Claims**

1. In a Newtonian telescope that includes a base and a primary mirror for the telescope mounted on said base, a nose spaced along the axis of the telescope and forwardly of said primary mirror, a viewing assembly mounted on said nose disposed laterally of the viewing path extending between the primary mirror and the object viewed, and a flat mirror mounted on said nose providing a viewing path extending between the viewing assembly and said primary mirror,

nose mounting means rotatably mounting said nose for rotation about the axis of the telescope thus to swing the viewing assembly in an arc extending about said axis, said nose mounting means including an annular mounting frame, and truss rods extending from and interconnecting the annular mounting frame and said base, said annular mounting frame having a guide surface and the guide surface guidably supporting said nose for rotatory movement, and



means rotatably mounting the telescope for rotation about a polar axis.

4,927,253

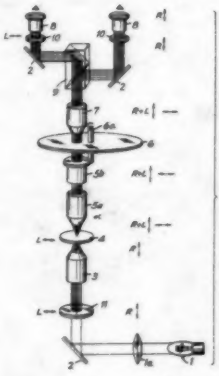
APPARATUS FOR THE RELATIVE INCREASE OF DEPTH SHARPNESS AND IMPROVEMENT OF RESOLVING POWER OF MAGNIFYING SYSTEMS, PARTICULARLY MICROSCOPES

Istvan Stuber, Nagyenyed u. 16, H-1123 Budapest; Geza Nagy, Jozseg Attila u. 135, H-1195 Budapest, and Peter Petrak, Istenhegyi ut 20/c, H-1126 Budapest, all of Hungary

Filed Jan. 4, 1988, Ser. No. 140,387

Int. Cl.[5] G02B *21/20, 21/16*

U.S. Cl. 350—508 **16 Claims**



1. Apparatus for increasing the depth sharpness and resolving power of magnifying systems, comprising:

a first primary magnifier;

a first secondary magnifier;

an illuminating system for producing the image of an object to be viewed, wherein said illuminating system emits electromagnetic radiation with a wavelength other than that of visible light;

an image-forming layer disposed in the optical path between

the first primary magnifier and the first secondary magnifier in the image plane of the first primary magnifier and in the object plane of the first secondary magnifier, said layer being formed by independent particles dispersed in a medium having an index of refraction different from that of said particles, said image-forming layer being displaceable in said image plane;

a second primary magnifier, where said first and second primary magnifiers produce, at different angles on said image-forming layer, first and second images of the object to be viewed; and

a second secondary magnifier, where said first secondary magnifier projects said first image for viewing by a first eye of a viewer, and said second secondary magnifier projects said second image for viewing by a second eye of said viewer.

4,927,254

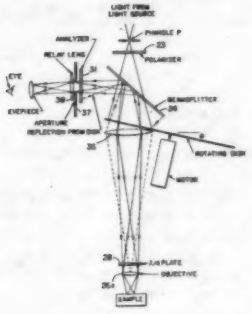
SCANNING CONFOCAL OPTICAL MICROSCOPE INCLUDING AN ANGLED APERTURED ROTATING DISC PLACED BETWEEN A PINHOLE AND AN OBJECTIVE LENS

Gordon S. Kino, and Guoqing Xiao, both of Stanford, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Continuation-in-part of Ser. No. 31,516, Mar. 27, 1987, abandoned. This application Jul. 29, 1988, Ser. No. 226,044

Int. Cl.[5] G02B *21/06*

U.S. Cl. 350—507 **13 Claims**



1. A scanning microscope for viewing an object comprising:

a light source;

a pinhole for receiving light from said light source;

an objective lens disposed to focus light from said pinhole onto said sample surface area;

an apertured rotating disc placed between said pinhole and said objective lens with the axis of rotation of said disc at an angle with respect to the axis of the light from said pinhole passing through apertures in aid apertured rotating disc to said objective lens and sample, said objective lens serving to focus light reflected at said sample surface onto said rotating disc whereby light reflected from said surface is transmitted through said apertures; and

means for directing said transmitted light onto an image plane and for eliminating from said image plane light from the pinhole reflected by said rotating disc.

4,927,255

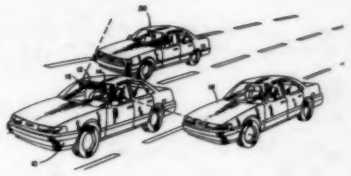
AUXILIARY REAR VIEW MIRROR ASSEMBLY

Santiago Martinez, 87 Davis Rd., Storrs, Conn. 06268

Filed Mar. 1, 1989, Ser. No. 317,602

Int. Cl.[5] G02B *27/02*

U.S. Cl. 350—616 **34 Claims**



15. An auxiliary rear view mirror assembly which attaches onto an existing automotive main rear view mirror of the type which has a laterally elongated frame and means connected to said frame to support the rear view mirror on a motor vehicle, the assembly comprising left side and right side auxiliary mirrors, left side and right side support plate assemblies each including means for attaching same onto a rear surface of the frame of the main rear view mirror, a rigid support connector for connecting the left and right support plate assemblies to one another when the latter are attached onto said main rear view mirror frame; left and right auxiliary arms connecting the left and right side auxiliary mirrors respectively to the left side and right side support plate assemblies to position and hold the left side auxiliary mirror leftward of the main rear view mirror and to position and hold the right side auxiliary mirror rightward of the main rear view mirror; and respective left and right side auxiliary mirror position adjusting means for independently adjusting the positions of the left side auxiliary rear view mirror and the right side auxiliary rear view mirror in three dimensions, namely right-left, up-down, and fore-aft with respect to the main rear view mirror after the auxiliary rear view mirror assembly has been installed thereon.

4,927,256

MULTISPECTRAL OPTICAL DEVICE COMPRISING MIRRORS

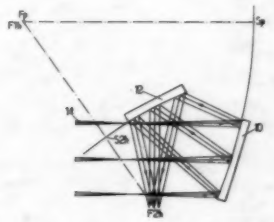
Jean Lacuve, Athis Mons, France, assignor to Societe d'Applications Generales d'Electricite et de Mecanique Sagem, Paris, France

Filed Jul. 26, 1989, Ser. No. 385,129

Claims priority, application France, Jul. 26, 1988, 88 10060

Int. Cl.[5] G02B *5/10*

U.S. Cl. 350—619 **9 Claims**



1. Mirror device for providing an image of a remote object, comprising:

a primary concave mirror whose surface is an off-axis portion of a paraboloid having a rotational symmetry about an axis, and

a secondary concave mirror whose surface is an off-axis

portion of a hyperboloid one focus of which coincides with the focus of the paraboloid, wherein

the mirrors have sizes of the same order of magnitude,

the primary mirror is so located with respect to the secondary mirror that a light beam received by the whole of the primary mirror and having a mean ray parallel to the axis of the paraboloid is unobscured by the secondary mirror, and

the radii of curvatures of the two mirrors along their respective axes do not differ by more than 10%.

4,927,257

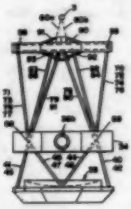
KINEMATIC TRUSS

David L. Enterline, San Jose, and Hugh L. Smith, Palo Alto, both of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Aug. 31, 1988, Ser. No. 239,083

Int. Cl.[5] G02B 7/182

U.S. Cl. 350—631 18 Claims



1. Apparatus for receiving a focused image comprising:

(a) a primary structure for holding a reflective device; and

(b) means for obtaining a reflection from the reflective device, said means for obtaining a reflection and said primary structure linked at a mounting means for the apparatus for receiving a focused image by a truss system, said primary structure further comprising a first primary four-bar linkage defining linkage action planes, the linkage action planes of the first primary four-bar linkage intersecting substantially at a focal point of the reflective device.

4,927,258

EYEGLASS HOLDER

Peter L. McKenna, 322 Falls Ct., Woodstock, Ga. 30188, and James M. Walters, III, 173 Autumn Ridge Trail, Roswell, Ga. 30076

Filed Nov. 9, 1988, Ser. No. 268,793

Int. Cl.[5] G02C 3/00

U.S. Cl. 351—156 10 Claims

1. An eyeglass holder comprising:

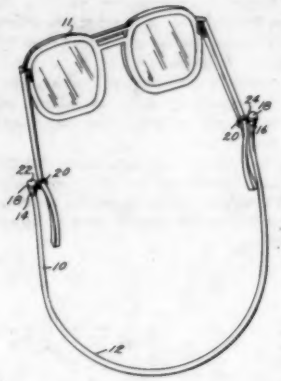
an elongated, flexible, hollow tube defining first and second ends;

means attached to at least one of said ends for removably covering said end to close said hollow tube interior;

means in operative relationship with said tube and with said covering means for receiving and holding earpieces of said eyeglasses, whereby said eyeglasses can be suspended from the wearer's neck;

said covering means including a first cap of predetermined size and shape to removably fit within and close said first end of said hollow tube;

said hollow tube interior defining a first opening at said first end, said opening defining a wall having a boss within the opening, and wherein said cap defines an enlarged flexible end portion for releasably engaging and snap-fitting over



said boss to releasably hold said cap in position to close said opening.

4,927,259

APPARATUS AND METHOD FOR TESTING VISUAL FIELD

Joerg Weber, Auf dem Muehlenacker 40, 5030 Huerth-Hermuelheim, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,074

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1987, 3742945

Int. Cl.[5] A61B 3/02

U.S. Cl. 351—224 3 Claims

1. A method for testing the visual field of a person comprising the steps of:

illuminating points of light distributed over the visual field of the person being tested at predetermined intensities;

accepting responsive inputs from said person under test indicative of whether said person under test can see each of said points of light at said predetermined intensity;

monitoring the intensity of each point of light;

collecting data measurements by correlating the intensity of each point of light with a corresponding responsive input;

increasing the intensity of a point of light when said corresponding responsive input indicates that person under test cannot see said point of light;

decreasing the intensity of a point of light when said corresponding responsive input indicates that said person under test can see said point of light;

changing into a next phase of reversed intensity changes when a change in said corresponding responsive input to the previous input is detected whereby the step between the logarithm of successive intensities of said point of light is increased within a phase if the phase corresponds to an increasing intensity phase and decreased within a phase if the phase corresponds to a decreasing intensity phase;

cycling each of said points of light through a complete measurement cycle having at least one phase; and

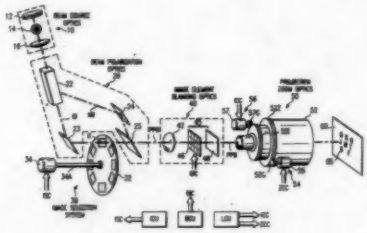
using the data measurements obtained during said measurement cycle to measure the field of vision of said person under test.

4,927,260

APPARATUS AND METHOD FOR THE PRECISION EVALUATION OF VISUAL FUNCTION IN THE FOVEA CENTRALIS (MACULA) AREA OF THE RETINA

Orville Gordon, 12915 Hunters Arrow, San Antonio, Tex. 78230

Filed Oct. 11, 1988, Ser. No. 255,875
Int. Cl.[5] A61B 3/02
U.S. Cl. 351—243 11 Claims



1. A foveal vision evaluation instrument for evaluating visual :unction in the foveal (macular) area of the retina, comprising:

(a) Foveal test image means for projecting an image that is substantially within the foveal field of vision;

(b) image magnification means for controlling the magnification of the image within the foveal field and

(c) foveal vision measurement means for controlling said image magnification means to incrementally change image magnification within the foveal field based on patient responses indicative of the patient's foveal vision function;

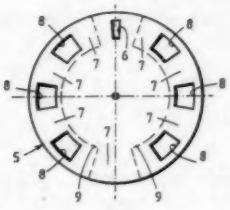
thereby measuring foveal vision including any degeneration in foveal vision function such as is manifested by foveal segmentation and abnormalities or changes in foveal vision.

4,927,261

METHOD AND APPARATUS FOR PHOTOGRAPHING A MOVEMENT

Ahti Rahikainen, Käpäkuja 12, 00760 Helsinki, Finland

Filed Sep. 30, 1988, Ser. No. 251,898
Claims priority, application Finland, Oct. 6, 1987, 874374
Int. Cl.[5] G03B 19/18, 21/32
U.S. Cl. 352—39 16 Claims



1. An apparatus for photographing a moving subject in order to study the motion of said subject wherein said subject is externally illuminated by a background lighting source and said subject has means for generating at least one light beam of essentially one selected wavelength from at least one moving point of said subject, said apparatus comprising:

a camera;

means for mounting said camera in front of said subject;

a disc having at least one transparent aperture allowing transmission of the light of said background lighting source reflected from said subject, a plurality of filter apertures circumferentially spaced from one another and from said at least one transparent aperture, a plurality of opaque regions of said disc separating said filter apertures from one another and said at least one transparent aperture from said filter apertures, and means, connected to said disc and associated with filter apertures, for filtering light such that only the light of said essentially one selected wavelength is transmitted through said filter apertures; and

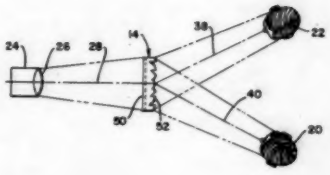
means, connected to said mounting means, for rotating said disc in front of said camera such that said at least one light beam and said reflected light enter said camera through, respectively, said filter and transparent apertures, whereby a photograph produced by said camera comprises a series of light-streaks produced by said at least one light beam entering said camera through said filter apertures, a series of interruptions between said light-streaks produced by said opaque regions between said filter apertures and a series of stroboscopic images of said subject produced by said reflected light entering said camera through said at leat one transparent aperture.

4,927,262

MULTIPLE PUPIL PROJECTION DISPLAY

Alfred Schwartz, Manhattan Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 26, 1989, Ser. No. 343,326
Int. Cl.[5] G03B 21/60
U.S. Cl. 353—13 20 Claims



9. A multiple pupil projection lens comprising:

a field lens element having a first face and a second face, said second face of said field lens element comprising at least first and second sets of Fresnel lens segments, said first set of Fresnel lens segments having the equivalent curvature of a first lens and said second set of Fresnel lens segments having the equivalent curvature of a second lens, said first and second Fresnel lens segments being shaped to form first and second exit pupils.

4,927,263

POSITION AND VELOCITY IMAGING SYSTEM USING 2-D LASER DIODE ARRAY

Peter J. de Groot; Steven H. Macomber, both of Bethel, and Gregg M. Gallatin, Monroe, all of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

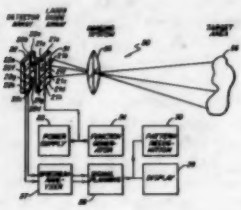
Filed Aug. 15, 1988, Ser. No. 232,074
Int. Cl.[5] G01C 3/08; G01N 21/00; G06K 9/46
U.S. Cl. 356—5 8 Claims

1. An optical radar system for determining range and velocity information of a target comprising

a plurality of laser diodes for emitting a plurality of laser beams to a target;

a plurality of photodetectors, each responsive to one of said laser diodes for sensing variations therein caused by light

which is from the one of said laser diodes and which is backscattered from the target;



processing means connected to each photodetector for calculating range and velocity information of the target.

4,927,264

NON-INVASIVE MEASURING METHOD AND APPARATUS OF BLOOD CONSTITUENTS

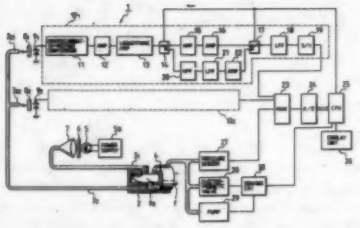
Toshikazu Shiga, Kyoto, and Takuji Suzaki, Uji, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Dec. 1, 1988, Ser. No. 278,494

Claims priority, application Japan, Dec. 2, 1987, 62-304975; Dec. 2, 1987, 62-304976; Dec. 3, 1987, 62-306481

Int. Cl.[5] A61B *5/00*; G01N *21/17*

U.S. Cl. 356—41 8 Claims



1. An apparatus for measuring a blood constituent in a living body, comprising:

light source means for illuminating a measuring part of said living body by at least two kinds of light beams with different wavelength components;

photodetecting means for detecting light beams transmitted from said measuring part;

logarithm-converting means for logarithm-converting photodetected signals outputted from said photodetecting means;

signal separation means for separating time-variant venous signal components corresponding to respective wavelength components from logarithm-converted signals;

pressure application means for applying pressure to a proximal portion from said measuring part; and

computing means for controlling said pressure application means so that said pressure may change with a peak value being about the minimum blood pressure and calculating a venous blood constituent characteristic on the basis of said venous signal components separated by said signal processing means.

4,927,265

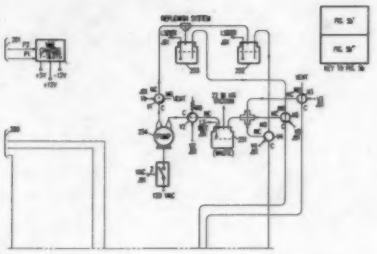
DETECTOR FOR FLUORESCENCE AND ABSORPTION SPECTROSCOPY

Robert G. Brownlee, Los Altos Hills, Calif., assignor to 501 Microphoretic Systems, Inc., Sunnyvale, Calif.

Filed Apr. 29, 1988, Ser. No. 187,789

Int. Cl.[5] G01N *21/31, 21/64*

U.S. Cl. 356—73 21 Claims



1. A fluorescence and absorption detector comprising:

light source means for simultaneously providing a first light beam and a second light beam wherein said first and second light beams are simultaneously incident upon and interact with a sample and emerging light from such a sample is characteristic of said sample;

means, receiving said emerging light, for separating light into a number of different wavelengths wherein said emerging light is separated into different wavelengths; and

means, receiving each of said different wavelengths from said means for separating light, for providing an output signal corresponding to each of said different wavelengths;

wherein said first light beam includes a wavelength of light causing such a sample to fluoresce and said second light beam includes a wavelength absorbed by such a sample;

said emerging light comprises unabsorbed light from said second light beam and fluorescent radiation; and

a first subset of said output signals represent said flourescent radiation from such a sample and a second subset of said output signals represent said unabsorbed light from such a sample.

4,927,266

OPTICAL SIGNAL GENERATING APPARATUS AND OPTICAL POWER METER CALIBRATING SYSTEM USING THE SAME

Itsuo Sugiura; Yutaka Nishida; Kaoru Ito, and Toshiyuki Ozaki, all of Tokyo, Japan, assignors to Anritsu Corporation, Tokyo, Japan

PCT No. PCT/JP88/00316, § 371 Date Nov. 29, 1988, § 102(e) Date Nov. 29, 1988, PCT Pub. No. WO88/07700, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 30, 1988, Ser. No. 283,474

Claims priority, application Japan, Mar. 30, 1987, 62-76768; Jul. 31, 1987, 62-193069

Int. Cl.[5] G01J *1/08, 1/10*

U.S. Cl. 356—243 12 Claims

1. An optical signal generating apparatus comprising:

a light source;

light source driving means for driving said light source;

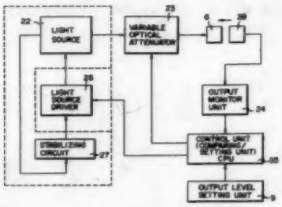
optical level adjusting means for receiving output light from said light source and adjusting the level of the output light;

optical output means for externally outputting the output light from said optical level adjusting means;

optical level setting means for setting the output light externally output from said optical output means to be a desired level;

output light monitoring means, detachably connected to said optical output means, for monitoring the output light; and

control means for comparing an optical output level set signal from said optical output level setting means with an output signal from said output light monitoring means to supply a control signal for adjusting the level of the output



light externally output from said optical output means to said optical level adjusting means in accordance with a comparison error, and when the comparison error becomes zero, for maintaining a value of the corresponding control signal to control such that said optical output means outputs output light of the desired level set by said optical output level setting means even after said optical output means is disconnected from said output light monitoring means.

4,927,267

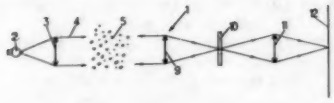
METHOD AND APPARATUS FOR OPTICALLY MEASURING, WITHOUT CONTACT, THE GRANULOMETRY OF A CLOUD OF PARTICLES OR THE ROUGHNESS OF A SURFACE

Philippe Hervé, Paris, France, assignor to Universite Paris X - Nanterre, Nanterre, France

Filed Mar. 21, 1989, Ser. No. 326,367

Int. Cl.[5] G01N *21/47*

U.S. Cl. 356—336 **10 Claims**



1. Method for the contactless measurement in real time of the granulometry of a cloud of particles or of the roughness of a surface characterized in that:

a diffraction pattern is formed of the cloud of particles or of the surface of the body, by means of a convergent lens,

this diffraction pattern is multiplied, in intensity, by a function f(r) such that

$$A(r^{1.5}+Br_o^4)<f(r)<A(r^4+Br_o^4)$$

with

A=constant determined by calibration

B=constant: $0<B<0.1$

r=distance measured in the focal plane of the lens with respect to the optical axis thereof,

r_o =maximum useful radius of the spatial filter,

and a reverse Fourier transform is carried out on the result of this multiplication, whose result forms the desired spectrum of the granulometry of the cloud of particles or the desired spectrum of the roughness of the surface.

4,927,268

OPTICAL ANALYSIS

Robert Carr; David J. Clarke, and Tony Atkinson, all of Salisbury, United Kingdom, assignors to Public Health Laboratory Service Board, Salisbury, United Kingdom

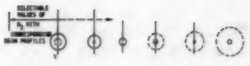
PCT No. PCT/GB87/00627, § 371 Date Jul. 5, 1988, § 102(e) Date Jul. 5, 1988, PCT Pub. No. WO88/01736, PCT Pub. Date Mar. 10, 1988

PCT Filed Sep. 7, 1987, Ser. No. 215,070

Claims priority, application United Kingdom, Sep. 5, 1986, 8621426

Int. Cl.[5] G01N *15/02*

U.S. Cl. 356—336 **14 Claims**



1. Apparatus for optical analysis comprising a detection zone; a common optical fibre for carrying first and second laser beams which are mutually coincident and of different wavelengths; a common focusing lens arranged to focus the two beams at respective focal points spaced longitudinally of an axis extending through the detection zone, such that in the detection zone the transverse extents of the two beams are different and in a predetermined ratio, and a pair of light detectors focused at the detection zone and responsive respectively to light scattered from the first and second laser beams.

4,927,269

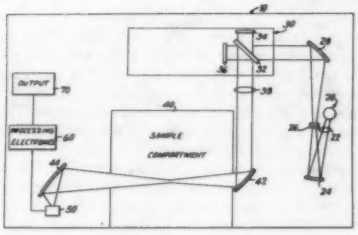
CORRECTION OF NON-LINEARITIES IN DETECTORS IN FOURIER TRANSFORM SPECTROSCOPY

Axel Keens, and Arno Simon, both of Karlsruhe, Fed. Rep. of Germany, assignors to Bruke Analytische Messtechnik GmbH, Rheinstetten, Fed. Rep. of Germany

Filed Jan. 31, 1989, Ser. No. 304,697

Int. Cl.[5] G01B *9/02*; G01J *3/45*

U.S. Cl. 356—346 **11 Claims**



1. In a Fourier transform spectrometer comprising means for forming an interferogram, a detector for detecting the interferogram and signal processing means connected to said detector for Fourier transforming a signal representative of the interferogram detected by said detector, a method of compensating for non-linearities in said detector and/or said signal processing means comprising the steps of:

forming an interferogram by interfering two beams of radiation,

detecting said interferogram by producing a signal representative of said interferogram,

said signal having first spectral components below a cutoff frequency of said detector and second spectral components above said cutoff frequency,

determining from said first and second spectral components first and second correction factors of the interferogram,

calculating a corrected interferogram using said first and second correction factors, and

Fourier transforming said corrected interferogram to form a corrected Fourier transform.

4,927,270

METHOD OF AND APPARATUS FOR DETERMINING MELTING POINTS

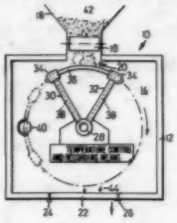
John A. Bonnard, P.O. Box 781393, Sandton, Transvaal, South Africa

Filed Nov. 9, 1988, Ser. No. 269,014

Claims priority, application South Africa, Nov. 18, 1987, 87/8616

Int. Cl.[5] G01N *25/04*

U.S. Cl. 374—16 **9 Claims**



1. A method of determining the melting point of a powdered or particulate material which includes the steps of producing a heated surface, gradually increasing the temperature of the heated surface, causing a succession of samples of the material to contact the heated surface and moving the heated surface in between the loading of the succession of samples to discharge from the heated surface unmelted powdered or particulate material remaining from a preceding sample, and observing each sample of the material on the heated surface to detect whether the respective sample of the material melts on the heated surface.

7. Apparatus for determining the melting point of a powdered or particulate material which includes a container for the material, a surface, means for heating the surface to a desired temperature in a controlled manner, means for effecting relative movement between the surface and the container, means for releasing a plurality of samples of the material from the container to move successively under gravity action onto the heated surface, means for displacing unmelted material from the heated surface before a subsequent sample of the material moves onto the heated surface, and means for recording the temperature of the heated surface at which the material melts.

4,927,271

RECLOSEABLE TAMPER EVIDENT BAG WITH HOODED CLOSURE

Mark E. Branson, Shelbyville, Ind., assignor to KCL Corporation, Shelbyville, Ind.

Filed Dec. 12, 1988, Ser. No. 282,615

Int. Cl.[5] B65D *33/34*

U.S. Cl. 383—5 **16 Claims**

1. A tamper evident reclosable bag comprising two opposing plastic wall panels having a tamper evident hooded closure and reclosable separable fastener assembly attached to said wall panels proximate to the top, said assembly comprising:

oppositely disposed first and second cooperating fastener profile elements attached to the inside surfaces of said wall panels arranged in a position facing each other; and

said first and second cooperating fastener profile elements being selectively interlockable when pressed together and selectively releasable when pulled apart;

a hooded closure attached at a pair of lower portions thereof to the outside surfaces of said wall panels and having an integral upper portion thereof enveloping said top of said wall panels and preventing said cooperating fastener profile elements from being openable and reclosable prior to removal of said hooded closure;

said hooded closure having a line of perforations extending lengthwise across said hooded closure and situated below the top of said wall panels to effect removal of said hooded closure and allow access to said cooperating fastener profile elements thereby visually indicating the opened condition of said bag;

said upper portion of said hooded closure being adapted for easy removal from said wall panels by pulling said upper portion of said hooded closure above said top of said wall panels in an upward motion, thereby tearing said hooded closure along said line of perforations.

4,927,272

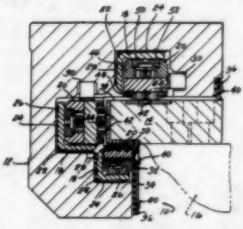
LINEAR BEARING WITH IMPROVED LUBRICATION SYSTEM AND METHOD

Robert E. Ward, Jr., Charlotte, N.C., assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed May 22, 1989, Ser. No. 355,262

Int. Cl.[5] F16C *29/06*

U.S. Cl. 384—13 **6 Claims**



1. In combination, a linear bearing (20) installed in a recess (18) in a structure (12) so as to support said structure (12) on a way surface (38), an adjustment mechanism (58) drivingly interconnecting said structure (12) and said linear bearing (20) to enable lengthwise shifting of the position thereof in said

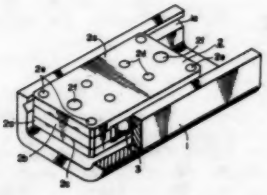
recess (18), a lubrication system for directing lubricant into said linear bearing (20), said lubrication system characterized by a lubricant injector assembly (60) mounnted in said structure (12) and having an injector tube (96) extending in a lengthwise direction into said recess (18), said linear bearing (20) having a receptor (98), with said injector tube (96) telescoped into said receptor (98) to accommodate said adjustment of said linear bearing (20) in said recess (18).

4,927,273

LINEAR MOTION ROLLING CONTACT BEARING ASSEMBLY HAVING A FEED-IN PORT

Tatsuo Mottate, Mitaka, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan

Filed Jul. 21, 1988, Ser. No. 222,605
Int. Cl.[5] F16C *29/06*
U.S. Cl. 384—45 3 Claims



1. A linear motion rolling contact bearing assembly comprising:

a rail extending over a predetermined distance and including at least one guide groove which defines a predetermined travel path;

a slider operatively coupled to said rail to travel along said predetermined travel path in either direction, said slider including a main body provided with at least one endless circulation path and at least one feed-in port for feeding roller members into said endless circulation path, said at least one feed-in port being in communication with said endless circulation path, means for plugging said at least one feed-in port to prevent egress of roller members therefrom, said endless circulation path including a load path section defined along one side of said main body opposite to said guide groove, and said endless circulation path being provided with a plurality of said rolling members which may roll along said endless circulation path whereby said rolling members provide a rolling contact between said slider and said rail by engaging with said guide groove when located at said load path section;

wherein said main body includes a pair of upper and lower bearing plates which are formed with grooves and which when brought together in a face-to-face contact define said endless circulation path and said at least one feed-in port;

wherein said upper and lower bearing plates are generally rectangular in shape and identical in structure and said at least one feed-in port is defined at one end portion of said main body; and

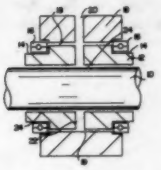
wherein said main body also includes a pair of front and rear end plates fitted into front and rear clearances defined at front and rear ends of said main body when said pair of upper and lower bearing plates are brought together, whereby one of said pair of front and rear end plates serves as said means for plugging.

4,927,274

SLIP RING AIR BEARING

Robert S. Smith, 1263 Emory St., San Jose, Calif. 95126

Filed Jun. 23, 1989, Ser. No. 370,607
Int. Cl.[5] F16C *21/00*
U.S. Cl. 384—101 7 Claims



1. A journal air bearing to support a rotor having an axially symmetric surface, said bearing comprising:

a sleeve having two ends and an inner and outer surface concentric with said rotor;

said inner surface defining an air bearing space with said rotor surface;

a stator having a stator wall which defines a chamber having a surface enclosing said sleeve;

a ball bearing on each said sleeve end having an outer surface in supporting contact with said chamber surface and an inner surface in supporting contact with said said outer sleeve surface defining a closed space between said chamber surface and said outer sleeve surface;

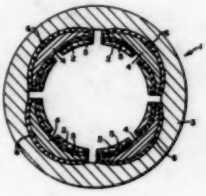
said airbearing space supplied by pressurized air from a supply of air through a passage leading from said pressurized air supply, through said stator wall and said sleeve, to said airbearing space.

4,927,275

EQUALIZING HYDRODYNAMIC BEARING

James L. Lawson, Simsbury, Conn., assignor to The Torrington Company, Torrington, Conn.

Filed Sep. 23, 1988, Ser. No. 248,062
Int. Cl.[5] F16C *17/03*
U.S. Cl. 384—117 17 Claims



1. A hydrodynamic bearing assembly for supporting an opposing moving member, said bearing assembly comprising: a plurality of bearing pads adjacent to said moving member; a support structure; a plurality of equalizing pads disposed between said bearing pads and said support structure; and an elastomeric layer disposed between said bearing pads and said equalizing pads, wherein at least two bearing pads are attached to each equalizing pad.

4,927,276
POCKET CAGE

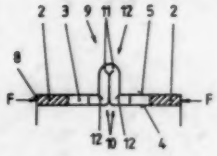
Robert Stolz, Schweinfurt; Kurt Mirring, Gochsheim; Rudolf Hein, Hambach; Dieter Simon, Kolbingen; Lothar Raab, and Peter Glatz, both of Mühlheim, all of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Continuation of Ser. No. 130,000, Dec. 8, 1987, abandoned. This application Aug. 16, 1989, Ser. No. 395,142

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1986, 3642114

Int. Cl.[5] F16C *33/54*

U.S. Cl. 384—572 5 Claims



1. In a pocket cage, formed from a deformable sheet, having first and second side rings and a plurality of webs extending therebetween, each web having a projection in its middle area when formed comprising a folding formed by bending at a plurality of bending points, including a bending point at the middle of each web, the improvement wherein at least the material in the middle of each web of said deformable sheet has reduced resistance to bending relative to the segments of material of the respective web adjoining the bending points and on either side of said bending points; and whereby bending produces a radial projection in the middle of each web, comprising a felded laminate, each lamina tapering steadily radially outwardly from the radius of the side rings to the region of a central bend.

4,927,277
PRINTER HAVING A DEVICE FOR ADJUSTING THE PRINTING CONDITION, DEPENDING UPON PAPER THICKNESS

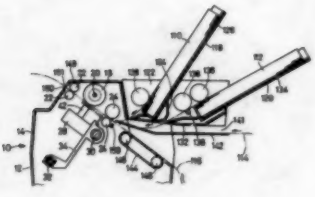
Takeshi Nifkawa, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Apr. 3, 1989, Ser. No. 332,057

Claims priority, application Japan, Apr. 6, 1988, 63-84423

Int. Cl.[5] B41J *11/50*

U.S. Cl. 400—56 18 Claims



1. A printing apparatus for printing on a recording medium, comprising:

a platen mounted on a frame, for supporting the recording medium;

a print head for effecting a printing operation on the recording medium supported by the platen, while the print head is moved along the platen;

changeover means for changing a printing condition of the print head;

a plurality of medium delivery devices for delivering different types of the recording medium, at least one of said medium delivery devices including at least one of a sheet stacker for supporting a stack of cut sheets as one of said different types of recording medium and pressing a top sheet of said stack against a feed roll, and a paper casing supported by said frame for accommodating a corresponding one of said different types of recording medium;

a medium feeding device for feeding the recording medium from one of said medium delivery devices a along a feed path leading to a printing position between said platen and said print head;

at least one of five elements which consist of (a) a first detector generating a first signal when said sheet stacker is moved to a fully retracted position thereof remote from said feed roll, (b) a second detector generating a second signal when said paper casing is removed from said frame, (c) selector means for generating a third signal for selecting one of said medium delivery devices from which the recording medium is delivered for printing by said print head, (d) a third detector generating a fourth signal indicative of an absence of the recording medium from said selected medium delivery device, in said feed path, and thereby detecting depletion of said recording medium in said selected medium delivery device, and (e) an operator-controlled print start switch for generating a fifth signal for initiating said printing operation;

medium thickness detecting means for detecting the thickness of the recording medium; and

control means responsive to a trigger signal which consists of one of said first, second, third, fourth and fifth signals and which is indicative of a possibility of a change in the thickness of the recording medium, for activating said medium thickness detecting means to detect the thickness of the recording medium, and activating said changeover means to change the printing condition of said print head, depending upon the thickness of the recording medium detected by said medium thickness detecting means.

4,927,278
TAPE CASSETTE AND TAPE PRINTER FOR USE THEREWITH

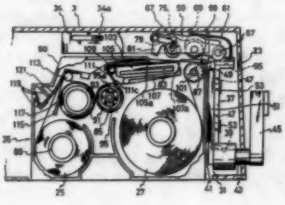
Susumu Kuzuya, Gifu; Yoshiaki Nagao, Mizuho; Hideo Asakura, Nagoya, and Shigenori Hattori, Aichi, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Dec. 28, 1988, Ser. No. 291,143

Claims priority, application Japan, Dec. 29, 1987, 62-199662[U]; Oct. 17, 1988, 63-135230[U]; Oct. 17, 1988, 63-135277[U]

Int. Cl.[5] B41J *35/28*

U.S. Cl. 400—208 10 Claims



1. A tape cassette for being detachably loaded in a tape printer having a frame, a printing head, a platen and tape driving means, said printing head and platen being provided in a printing area in said-frame, said printing head and said platen being relatively movable between an inoperative position, at which they are spaced apart, and an operative position, in which they are in contact with each other to perform a printing operation, comprising:

a housing with a tape outlet;

first to third accommodating sections provided in said housing;

an image source tape accommodated in said first accommodating section and driven by said tape driving means between said printing head and platen;

a substantially transparent image receiving tape accommodated in said second accommodating section, driven by said tape driving means in an overlapped state over said image source tape between said printing head and platen, said image receiving tape having a printing surface facing said image source tape, an image being transferred to said printing surface through said image source tape by said printing head in a printing operation; and

an adhesive tape accommodated in said third accommodating section, driven by said tape driving means, and applied to said printing surface of said image receiving tape after the printing operation.

4,927,279

KEYBOARDS FOR HOMES

Ruth B. Morgan, 737 N. Nelson St., #28, Arlington, Va. 22203

Continuation of Ser. No. 589,412, Mar. 14, 1984, abandoned.
This application Sep. 11, 1989, Ser. No. 405,592
Int. Cl.[5] B41J *5/10*
U.S. Cl. 400—486 **3 Claims**

1. A keyboard display for use on typewriters and other typographical equipment having keys or key designations wherein three rows are provided with a top row of 10 keys, a center row of 11 keys, and a bottom row of 11 keys comprising:

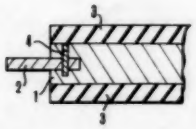
Five vowels, A, E, I, O, U, displayed in alphabetical order on the center five keys of the center row and said center row further displaying on the outer three keys at each end all of the punctuation marks, provided on said keyboard, said punctuation marks including the quotation mark, colon, semicolon, comma, question mark, and period and said top and bottom rows displaying only the remaining letters of the alphabet in horizontal ascending alphabetical sequence starting at the left end of the top row.

4,927,280

PLATEN ROLLER

Jun Murata, Saitama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 159,540, Feb. 22, 1988, abandoned.
This application Oct. 2, 1989, Ser. No. 415,461
Claims priority, application Japan, Feb. 23, 1987, 62-37734
Int. Cl.[5] B41J *11/02*; B41B *31/08*
U.S. Cl. 400—661 **11 Claims**



1. A platen roller comprising a solid cylindrical base body defining a longitudinal axis and having a first end, a second end and defining an outer surface having a predetermined diameter, said base body providing at least one rotating shaft such that a rotating shaft end protrudes from said first end and a rotating shaft end protrudes from said second end, said rotating shaft ends being aligned generally concentrically with said longitudinal axis;

said platen roller further comprising a hard elastic layer covering said outer surface of the base body having a predetermined diameter, wherein said base body is constructed from a metal selected from the group consisting of lead, iron, zinc and alloys of at least one of such metals, the ratio of the diameter of the base body to the diameter of the elastic layer being from 0.45–0.75:1,

said rotating shaft being secured to said base body by means of a pin positioned in said rotating shaft with at least one end at the peripheral surface of said base body, said pin positioned so as not to protrude into the hard elastic layer.

4,927,281

BRUSH FOR APPLYING MASCARA AND CONTAINER

Jean-Louis Gueret, Paris, France, assignor to L'Oreal, Paris, France

Filed Feb. 10, 1989, Ser. No. 308,726
Claims priority, application France, Feb. 12, 1988, 88 01690
Int. Cl.[5] A46B *9/06, 11/00*
U.S. Cl. 401—129 **13 Claims**

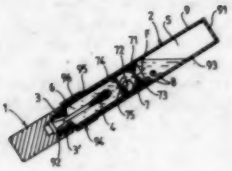
1. A brush for applying a makeup product, in particular for applying mascara to the eyelashes or a dye to the hair, including a plurality of bristles held between the spirals of at least two branches of a helically twisted metal wire that forms the core defining the longitudinal axis of the brush, wherein over at least a portion of a brush, some of said bristles are provided at the surface thereof with at least one groove extending substantially from the base to the tip of said respective bristles, and some of said plurality of bristles having cross sections which have different shapes from that of other of said bristles, so that said plurality of bristles comprise at least two types, and that the bristles, having different cross-sectional shapes, are spaced apart along said axis of the core, and that a space exists between the bristles to permit the penetration of the eyelashes or hair, the bristles of different cross-sectional shapes resulting in filling of different amounts of the product along the brush, some of said bristles having a cross section area larger than other of said bristles and the bristles having a cross section of larger area being made of a material capable of softening when it is dipped into the product intended to be spread by the brush.

4,927,282

CONTAINER FOR NAIL POLISH

Bruno Morane, Neuilly, and Gérard Joulia, Paris, both of France, assignors to L'Oreal, Paris, France

Filed Mar. 13, 1989, Ser. No. 322,571
Claims priority, application France, Mar. 11, 1988, 88 03192
Int. Cl.[5] A45D *34/00*; A46B *11/00*
U.S. Cl. 401—129 9 Claims



1. A container for nail polish including a bottle for containing the nail polish and a stopper provided with a brush affixed with a rod whereby said brush is dipped into the bottle when the container is closed, the bottle being elongated in shape, and being divided along its length into a first and a second compartment separated by a valve means, the brush being contained entirely within the first compartment, which is the closest to the stopper, said valve means having a valve member which moves to a closed position when said container is substantially vertically upright with said first compartment disposed above said second compartment and to an open position at least when said second compartment is disposed at least partially above said first compartment.

4,927,283

APPLICATOR DEVICE WITH PUNCTURING MEANS

Holger Fitjer, Ansbach, Fed. Rep. of Germany, assignor to Georg Karl geka-brush GmbH, Bechhofen-Waizendorf, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 344,330
Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814305
Int. Cl.[5] A47L *17/00*; A61M *35/00*
U.S. Cl. 401—132 20 Claims

1. An applicator device for the application of a liquid or pasty substance, comprising a handle means having an interior chamber, an applicator means having a sealed compartment in which said liquid or pasty substance is sealed, detachable connecting means on said handle means and on said applicator means detachably connecting said applicator means to said handle means, said applicator means having at least a part thereof made of a penetrable material, a release means movably mounted in said interior chamber of said handle means between an extended and a retracted position, said handle means having an opening opening up into said interior chamber, said release means having an operable part extending into said opening and disposed to be engageable by the user of the applicator to move said release means between said extended and retracted positions, said release means being movable from its retracted to its extended position to penetrate said penetrable material and thereby effect release of said liquid or pasty substance from said sealed compartment, said release means in its retracted position being spaced from said applicator means to enable connection of said applicator means to said handle means by said detachable connecting means while said liquid or pasty substance remains sealed in said sealed compartment.

4,927,284

PEN-LIKE EYEGLASS CLEANER

Allan Tsai, 2nd Fl., No. 1, Lane 222, Tun-Hua N. Rd., Taipei, Taiwan

Filed Jun. 20, 1989, Ser. No. 368,810
Int. Cl.[5] G02C *13/00*
U.S. Cl. 401—195 6 Claims

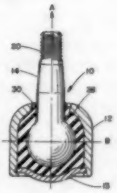
1. A pen-like eyeglass cleaner including a hollow pen body having a first end and a second end, a wiping tip of absorbent material disposed on said first end of said pen body, a detergent container mounted detachably in said pen body, an amount of detergent which is held in said container, a roll of cleaning cloth mounted detachably in said pen body, and a cap which is sized to firmly cover said first end of said pen body and has a clip secured thereto, characterized by a magnifying glass mounted detachably on said pen body, and a screwdriver mounted detachably on said clip.

4,927,285

BALL JOINT DESIGN

Steven P. Kotz, Norwalk, and John H. Lane, Hudson, both of Ohio, assignors to The Pullman Company, Princeton, N.J.

Continuation of Ser. No. 151,729, Feb. 19, 1988, abandoned.
This application May 15, 1989, Ser. No. 353,170
Int. Cl.[5] F16C *11/00*
U.S. Cl. 403—133 5 Claims



1. In a bonded ball joint having a ball-stud member with a ball portion at one end and a shank portion at the other end; an open-ended socket member surrounding said ball portion in spaced relationship thereto, said open end of the socket member forming a window in the socket member through which said shank portion projects, the window and ball-stud member defining clearance therebetween the ball-stud member and the socket member without allowing the ball portion to pass through the window, and an elastomer coating layer, bonded to said ball stud member and resiliently interconnecting the ball stud member and the socket member, the improvement comprising:

said socket member having an inner wall portion, said inner

wall portion being outwardly tapered away from the open end of the socket member in a smooth continuous manner for essentially its entire length for controlling and minimizing adverse stress concentration in the bonded ball joint.

4,927,286

RAPID CONNECTION BETWEEN TWO SHAFTS OR THE LIKE

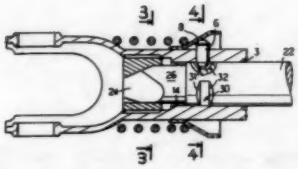
Audio Hobluigie; Jean-Pierre Barnabé, both of Valentigney, and Frederic Moubot, Voujeaucourt, all of France, assignors to ECIA - Equipements et Composants Pour L'Industrie Automobile, Audincourt, France

Filed Jul. 20, 1988, Ser. No. 221,583

Claims priority, application France, Jul. 20, 1987, 87 10238; Feb. 11, 1988, 88 01651

Int. Cl.[5] F16B *7/00*

U.S. Cl. 403—322 **5 Claims**



1. A rapid connection between two rotary members, such as shafts, having axes of rotation, said connection comprising, on an end of one of said rotary members, a cylindrical hollow socket having a wall defining said hollow of the socket, a cylindrical elongated stem on an end of the other rotary member, a fixed inner drive block having inclined inner faces and being in a fixed position in the socket, a pyramidal end head on the stem and having inclined faces corresponding to and cooperative with said inclined faces of the block, locking pins extending substantially radially through said wall of the socket and movable between an outer position in which the pins are retracted within said wall of the socket and out of said hollow of the socket, and an inner locking position in which the pins extend radially inwardly beyond said wall into said hollow of the socket, means associated with the pins for elastically biasing the pins to said inner locking position, means for retaining the pins in said outer position so long as the socket has not received the pyramidal end head, means on the stem cooperative with the pins for moving the pins to said outer position, and notches in the stem for receiving the pins in said inner locking position for axially locking together the two rotary members and ensuring a connection without any angular or axial play between said rotary members; wherein

said means for biasing the pins comprise a frustoconical ring slidably mounted on the socket and a spring for biasing the ring in a direction to cause the ring to bear against outer ends of the pins; and

the frustoconical ring is freely rotatable relative to the socket and defines, for each locking pin, a helical ramp, and the pins have a head on which the respective ramp is capable of fitting so that the ramp radially displaces the respective pin relative to the notches of the stem upon rotation of the frustoconical ring relative to the socket.

4,927,287

FASTENER FOR FASTENING PLATES TOGETHER

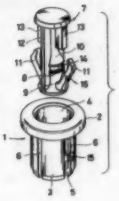
Toshiya Ohkawa, Nagoya; Hiromichi Nakayama, and Tatsuya Iguchi, both of Toyota, all of Japan, assignors to NIPCO, Inc., Yokohama, Japan

Filed Jun. 20, 1989, Ser. No. 368,759

Claims priority, application Japan, Jun. 28, 1988, 63-158201

Int. Cl.[5] F16B *13/06*

U.S. Cl. 403—408.1 **13 Claims**



1. A fastener, comprising:

a female body to be inserted through aligned first and second holes formed within overlapped first and second plates to be fastened together; and

a male body for causing flaring of said female body,

said female body having a head portion for engaging a plate surface portion surrounding said first one of said holes defined within said first plate, a plurality of circumferentially spaced-apart leg portions depending from said head portion and each having an inner projection projecting from a lower free end portion and an axially central male body insertion hole penetrating said head portion and extending axially centrally between said leg portions,

said male body having a pin-like portion having sufficient length so as to penetrate the entire length of said insertion hole, said pin-like portion having an axially intermediate large-diameter portion having a diameter not greater than the diameter of said insertion hole of said female body and first and second small-diameter portions separated by means of said large-diameter portion, said male body further having a plurality of elastic engagement pieces extending obliquely upwardly and outwardly from a lower end portion of said pin-like portion,

said fastener being capable of changing its state between a first state in which said male body is temporarily coupled to said female body by inserting said male body into said insertion hole of said female body such that said inner projections of said leg portions of said female body abut said first small-diameter portion of said male body and said elastic engagement pieces project outwardly through gaps defined between adjacent leg portions of said female body, a second state in which said leg portions of said female body are flared outwardly as a result of abutment of said inner projections of said leg portions of said female body with said large-diameter portion of said male body, and a third state in which said leg portions of said female body are brought closer to one another as a result of said inner projections of said leg portions of said female body being brought into abutment with said second small-diameter portion of said male body,

said female and male bodies being provided with respective stopper means which engage each other in said first state so as to prevent any change of said fastener from said first state to said second state,

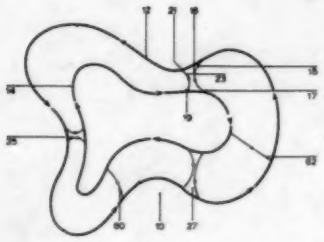
one of said female and male bodies being further provided with releasing means for releasing said engagement between said stopper means when said leg portions of said female body are inserted through said second one of said holes defined within said second plate to be fastened to said first plate.

4,927,288

ROAD TRAFFIC NETWORK

Subhash Rasweat, 84-49 168th St., Apt. 1U, Jamaica, N.Y. 11432

Filed Nov. 25, 1988, Ser. No. 276,038
Int. Cl.[5] E01C 1/00
U.S. Cl. 404—1 20 Claims



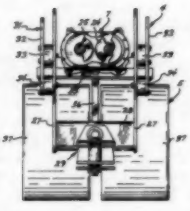
1. A road traffic system comprising:
(a) a first endless loop of roadway, directing traffic flow in a first one-way direction;
(b) a second endless loop of roadway, directing traffic flow in a second one-way direction opposite the said first one-way direction, said second endless loop of roadway being surrounded by said first endless loop of roadway and having no points of loop roadway intersection; and
(c) at least one traffic loop interconnecting roadway means having two roadway portions in one-way opposite directions extending between said first endless loop of roadway and said second endless loop of roadway, said interconnecting roadway means allowing traffic to transfer between said first and second endless loops without crossing over or intersecting traffic traveling on said road traffic system.

4,927,289

VIBRATORY MECHANISM FOR A COMPACTION ROLLER

Thomas G. Artzberger, Menomonee Falls, Wis., assignor to M-B-W Inc., Slinger, Wis.

Continuation-in-part of Ser. No. 210,911, Jun. 24, 1988, abandoned. This application Apr. 24, 1989, Ser. No. 342,539
Int. Cl.[5] E01C 19/26
U.S. Cl. 404—117 11 Claims



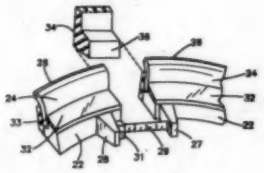
1. A compaction apparatus, comprising a first frame, a second frame, first resilient means interconnecting said first and second frames, second resilient means interconnecting said first and second frames and spaced from said first resilient means, a means mounted on said second frame and including a pair of eccentric weights constructed and arranged to add vertical vibrational forces generated by said weights and to cancel fore-and-aft vibratory forces, said first resilient means and said second resilient means being offset horizontally from a vertical plane passing through the axis of said drum, said first resilient means being offset a greater distance from said plane than said second resilient means, whereby the downward vertical vibratory forces acting through said offset distances will tend to rotate the drum and subject the soil to a shear type of action.

4,927,290

MANHOLE COVER SUPPORT RESISTANT TO WATER INFILTRATION

Harold M. Bowman, 18867 N. Valley Dr., Fairview Park, Ohio 44126

Continuation-in-part of Ser. No. 207,325, Jun. 15, 1988, abandoned, and a continuation-in-part of Ser. No. 201,573, Jun. 1, 1988, Pat. No. 4,867,600, and a continuation-in-part of Ser. No. 207,266, Jun. 15, 1988, Pat. No. 4,867,601, and a continuation-in-part of Ser. No. 207,185, Jun. 15, 1988, Pat. No. 4,872,780, and a continuation-in-part of Ser. No. 362,216, Jun. 6, 1989, and a continuation-in-part of Ser. No. 362,257, Jun. 6, 1989, each is a continuation-in-part of Ser. No. 76,668, Jul. 23, 1987, Pat. No. 4,834,574. This application Jul. 11, 1989, Ser. No. 378,412
Int. Cl.[5] E02D 29/14
U.S. Cl. 404—26 22 Claims



1. A manhole cover support adapted for accommodating a layer of paving around its outer perimeter and a manhole cover therewithin while raising the effective grade of an existing manhole cover receiving structure, the existing receiving structure having a manhole cover sill and an inside shoulder surface ascending therefrom, the manhole cover support comprising:
a body that has at least one adjustable joint equipped with spreader means for rendering the cover support adjustable in its outer perimeter dimension,
the spreader means being capable of creating a gap in the base upon expansion of the body;
a plurality of deformable seal elements comprising synthetic or natural resin-containing material; and
compressible plug means for each said adjustable joint,
the plug means comprising synthetic and/or natural resin-containing material,
the body including a base having a ledge for supporting the manhole cover,
the ledge having a lateral cover keeper arising therefrom,
the base having an outer wall, at least part of which is adapted to react around its periphery against said shoulder surface upon expansion of the body with the spreader means,
one of the seal elements being disposed on the ledge and at least one other of the seal elements being disposed substantially around the outer perimeter of the body including at least the outer wall of the base thereof,
the seal element around the outer wall of said base being sufficiently thick for obtaining continuity of contact between said outer wall and said shoulder surface,
the continuity being interrupted only by the gaps in the base,
the minimum thickness of the seal element around the outer wall of the base being between 8 and 9 mils, the maximum about 600 mils,
the coefficient of static friction of the seal element around said outer wall with respect to said shoulder surface sub-

stantially exceeding the coefficient of static friction obtainable directly between said outer wall and said shoulder surface,

the plug means being adapted to interact with the seal elements at the gaps to block substantial infiltration of surface water into the manhole.

4,927,291

JOINT SEAL FOR CONCRETE HIGHWAYS

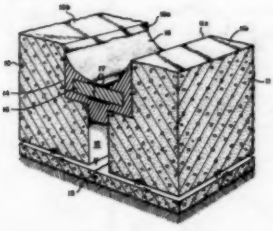
Michael C. Belangie, 27 Q St., Salt Lake City, Utah 84103

Continuation-in-part of Ser. No. 1,699, Jan. 9, 1987, Pat. No. 4,824,283. This application May 3, 1988, Ser. No. 189,631

The portion of the term of this patent subsequent to Apr. 25, 2009, has been disclaimed.

Int. Cl.[5] E01C *11/10*

U.S. Cl. 404—64 **12 Claims**



1. A sealed joint between adjoining slabs of concrete in a highway or other area subject to vehicular traffic, the slabs being separated by a shrinkage-control cut or by a construction joint, said sealed joint comprising a joint installation channel above and extending along and across said cut or construction joint, said channel having a width sufficiently narrow that traffic loads are carried by the concrete bordering said channel rather than by said sealed joint; a preformed and relaxed length of a ductile and elastic material within said channel bridging and extending along said shrinkage control cut or construction joint; a ductile and elastic type of adhesive bonding said preformed and relaxed length to at least part of the concrete faces of said installation channel, the concrete of the slabs being an ordinary type of concrete having voids at faces of the joint installation channel; and an antibonding material applied to width surfaces of the preformed and relaxed length that bridge and extend along the shrinkage control cut or construction joint and that are covered by the adhesive, said voids being filled by the adhesive.

12. A method of making a sealed joint between adjoining slabs of concrete in a highway or the like that are separated by a shrinkage-control cut or by a construction joint, comprising the steps of forming a sealed joint installation channel above and extending along and across said cut or construction joint, said channel above and extending along and across said cut or construction joint, said channel having a width sufficiently narrow that traffic loads are carried by the concrete bordering said channel; placing a preformed and relaxed length of a ductile and elastic material within said channel bridging and extending along said shrinkage control cut or construction joint; and bonding said preformed and relaxed length to at least part of the concrete faces of said installation channel by means of a ductile and elastic type of adhesive, the preformed and relaxed length being a strip of silicone material wound on itself as a roll and placed in the adhesive as it is being unrolled.

4,927,292

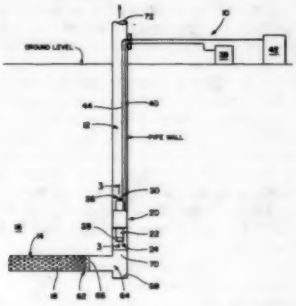
HORIZONTAL DEWATERING SYSTEM

Donald R. Justice, P.O. Box 458, Matlacha, Fla. 33909

Filed Mar. 17, 1989, Ser. No. 324,700

Int. Cl.[5] E02B *11/00*

U.S. Cl. 405—43 **6 Claims**



5. A method for removing water from underground, said method comprising the steps of:

digging a horizontally elongated trench,

locating a length of perforated pipe at the bottom of said trench,

covering said length of perforated pipe,

connecting a length of imperforate pipe to said perforated pipe, said imperforate pipe extending from above ground to said imperforate pipe located below ground,

inserting a submersible pump into and within said imperforate pipe, said submersible pump having a proximal discharge port and a distal suction port,

positioning said submersible pump in said imperforate pipe with said suction port being proximate said perforated pipe,

energizing said submersible pump,

creating a vacuum below said pump to draw water into said suction port of said pump from said perforated pipe and expelling water out of said discharge port of said submersible pump into said imperforate pipe, and

expelling water out of said imperforate pipe above ground level.

4,927,293

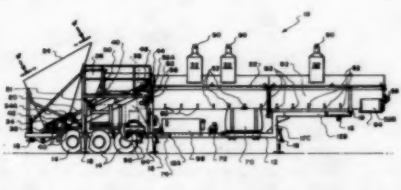
METHOD AND APPARATUS FOR REMEDIATING CONTAMINATED SOIL

Randy P. Campbell, 712 E. Locust, Lompoc, Calif. 93436

Filed Feb. 21, 1989, Ser. No. 312,934

Int. Cl.[5] B09B *3/00*

U.S. Cl. 405—128 **31 Claims**



1. An apparatus for remediating contaminated material, comprising:

(a) means for conveying a contaminated material from a receiving location to a transfer location;

(b) means for dispensing an absorbent material on the con-

taminated material between said receiving and transfer locations;

(c) means for receiving the contaminated and absorbent materials at said transfer location and for concurrently mixing the materials together and transporting them from said transfer location to a deposit location;

(d) means for applying an oxidizing material on the contaminated and absorbent materials between said transfer and deposit locations to produce mixing of the oxidizing material therewith between said transfer and deposit locations; and

(e) means for injecting oxygen containing gas the contaminated, absorbent and oxidizing materials between said transfer and deposit locations concurrently as the oxidizing material is being applied and the contaminated, absorbent and oxidizing materials are being mixed to produce a reaction therebetween which forms reaction by-products more environmentally acceptable than the contaminated material for discharge at said deposit location.

23. A method for remediating contaminated material, comprising the steps of:

(a) conveying a contaminated material from a receiving location to a transfer location;

(b) dispensing an absorbent material on the contaminated material between the receiving and transfer locations;

(c) receiving the contaminated and absorbent materials at the transfer location and concurrently mixing the materials together and transporting them from the transfer location to a deposit location;

(d) applying an oxidizing material on the contaminated and absorbent materials between the transfer and deposit locations to produce mixing of the oxidizing material therewith between the transfer and deposit locations; and

(e) aerating the contaminated, absorbent and oxidizing materials between the transfer and deposit locations concurrently as the oxidizing material is being applied and the contaminated, absorbent and oxidizing materials are being mixed to produce a reaction therebetween and form reaction by-products which are more environmentally acceptable than the contaminated material for discharge at the deposit location.

4,927,294

METHOD AND EQUIPMENT FOR LAYING AN ELONGATED ELEMENT UNDERGROUND

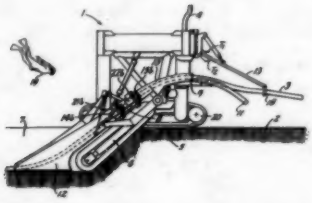
Francesco Magnani, Pavia, and Paolo Minardi, Martellago, both of Italy, assignors to Societa' Cavi Pirelli S.p.A., Milan, Italy

Filed Apr. 18, 1989, Ser. No. 339,407

Claims priority, application Italy, Apr. 22, 1988, 20292A

Int. Cl.[5] F16L *1/00*

U.S. Cl. 405—177 **20 Claims**



1. In the laying of an elongated element in a trench in the ground, which element has previously been laid on the ground, with apparatus which advances in a predetermined direction and which forms said trench, lifts said element from the ground at the upstream side of the apparatus and then deposits said element in said trench at the downstream side of the apparatus, said apparatus having ways for receiving and slidably engaging said element in its passage from the upstream side of said apparatus to the downstream side thereof, whereby a first portion of said element at and downstream of said apparatus is subjected to a first tension force in the direction of advance of said apparatus due to the friction between said ways and said element and to the resistance to movement of the portion of said element deposited in said trench and a second portion of said element upstream of said apparatus is subjected to second tensioh force in the opposite direction at the upstream side of said ways due to the weight of the lifted portion of said element upstream of said apparatus and to the resistance to movement of the portion of said element upstream of said apparatus, the method of at least partially offsetting any difference between said first tension forced applied to said elongated element in the first-mentioned said direction and said second tension applied to said element in said opposite direction which comprises engaging said element intermediate said upstream side and said downstream side of said apparatus and applying a third tension force to said element in the direction opposite to the direction of advance of said apparatus at least equal to said first tension force.

4,927,295

RETRIEVABLE GUIDE POST SYSTEM

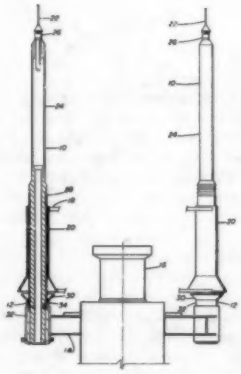
David G. Knowles, Cleckheaton, England, assignor to Cameron Iron Works USA, Inc., Houston, Tex.

Filed Jan. 9, 1989, Ser. No. 294,784

Claims priority, application European Pat. Off., Sep. 9, 1988, 88308354.5

Int. Cl.[5] E02D *5/74*; E21B *43/01*

U.S. Cl. 405—195 **16 Claims**



1. A retrievable guide post comprising

a tubular body having external means for engagement of said tubular body near its upper end,

a sleeve surrounding and axially movable along the lower portion of the tubular body and having an upper end and a lower end,

said lower end having a reduced wedging rim and external means for engagement of said sleeve close to the upper end,

a split latching ring supported on said body and coacting with said sleeve wedging rim,

a support ring positioned around said tubular body below said split latching ring,

means releasably securing said support ring to said tubular body, and

means connecting said support ring to said tubular body allowing a limited axial movement between said support ring and said tubular body whereby lifting forces on said tubular body can be transmitted to said split latching ring.

4,927,296

METHOD AND INSTALLATION FOR DISPLACING A JACKET OF AN ARTIFICIAL ISLAND IN RELATION TO AN UNDERWATER BASE

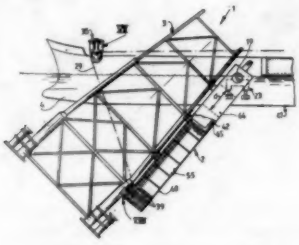
Willem P. Kaldenbach, The Hague, Netherlands, assignor to Allseas Engineering B.V., Netherlands

Filed Jan. 25, 1989, Ser. No. 301,058

Claims priority, application Netherlands, Oct. 4, 1988, 8802431

Int. Cl.[5] E02D *25/00*

U.S. Cl. 405—206 16 Claims



1. The method of placing an artificial island structure in a vertical standing position on an underwater base site, which comprises the steps of:

(a) loading the artificial island structure, while horizontal, from land onto a buoyant carrier disposed in water,

(b) affixing the horizontal artificial island to the carrier,

(c) transporting the carrier through the water to a large displacement buoyant vessel,

(d) journalling one end of the carrier upon the vessel,

(e) transporting the vessel to a position over the underwater base site,

(f) ballasting the carrier until the carrier swings vertically downwardly about said one end of the carrier to an upright position of the carrier and artificial island affixed thereto,

(g) suspending the upright artificial island from the vessel,

(h) disconnecting the carrier from the artificial island structure, and

(i) lowering the artificial island structure relative to the vessel until it is supported in vertical position on the underwater base site.

4,927,297

LEAK PREVENTION STRUCTURE, METHOD AND APPARATUS

William Simpson, Arlington Heights, Ill., assignor to Clem Environmental Corporation, Chicago, Ill.

Filed Oct. 4, 1988, Ser. No. 253,238

Int. Cl.[5] E02D *3/12*; C09K *17/00*

U.S. Cl. 405—270 12 Claims

1. A method of forming an in-situ sub-surface barrier to contaminated groundwater or other undesired groundwater flow in a soil structure comprising the steps of:

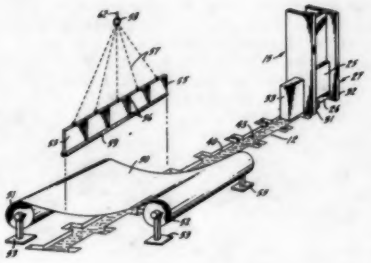
forming a trench in said soil structure, said trench having a depth substantially greater than its width, inserting into said trench a plurality of clay based sheets by,

positioning at least one flexible sheet of clay based material by said trench with a portion of said material extending over said trench, wherein each sheet having a low coefficient of permeability upon hydration thereof,

placing a weight on said portion,

and pushing said flexible sheet of clay based material into said trench,

lining at least one side of said trench with said sheets, and overlapping edges of adjacent sheets so that clay of one of said sheets contacts an adjacent sheet to form an impermeable joint, whereby a continuous internally extending



impermeable barrier is formed with a plurality of adjacent sheets.

4,927,298

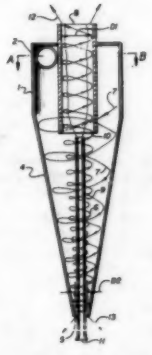
CYCLONE SEPARATING METHOD AND APPARATUS

Wlodzimier J. Tuszko, 6083 Fremont Cir., Camarillo, Calif. 93010, and Wojciech J. Tuszko, 427 S. Manhattan Pl., Apt. 104A, Los Angeles, Calif. 90020

Continuation-in-part of Ser. No. 158,916, Feb. 22, 1988, abandoned. This application Jun. 23, 1988, Ser. No. 210,371

Int. Cl.[5] B65G *53/60*, *53/62*

U.S. Cl. 406—173 6 Claims



1. In a method for separating a feed comprising particulate suspensions of liquid mixtures delivered in fluid flow to a cyclone separator of the type having an axially elongated cylindrical-conical separating chamber, a conical bottom portion, a cylindrical upper portion in said chamber, an exhaust pipe having bottom region in said cylindrical portion, and an inlet duct in said cylindrical portion for introducing said feed into said cylindrical portion in a tangential direction in a helical swirling flow pattern so as to establish within the separating chamber counterflowing inner and outer vortexes, causing a lighter portion of said feed to move to the inner vortex and exit through said exhaust pipe in the top or ceiling wall of the cylindrical portion as overflow and a coarser or heavier product to move to the outer vortex and exit through the bottom outlet in said conical portion as underflow; the improvement of the method comprising:

introducing a steady supply of air into the bottom region of said exhaust pipe to maintain a steady air core in said exhaust pipe.

4,927,299

INTEGRAL ACOUSTIC EMISSION SENSOR FOR MANUFACTURING PROCESSES AND MECHANICAL COMPONENTS

Subbiah Ramalingam, Roseville, and Darrell A. Frohrib, St. Paul, both of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Continuation of Ser. No. 52,788, May 21, 1987, abandoned. This application Apr. 24, 1989, Ser. No. 342,723

Int. Cl.[5] B23B *27/00*

U.S. Cl. 407—120 **13 Claims**

1. An acoustic emission sensor for sensing acoustic emissions from a machine element having a first edge which engages another part comprising a thin film piezoelectric material sensor deposited in a layer which is in integral atomic level bonding coupling with a surface of the machyine element after depositing without substantial mass to supporting the thin film piezoelectric layer, the thin film layer being selected to sense emission in the acoustic range and defined by a periphery which is adjacent but spaced from the edge of the machine element; and conductor means coupled to said piezoelectric sensor and to the machine element for sensing outputs in the acoustic emission range generated in said piezoelectric material sensor.

4,927,300

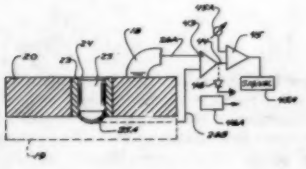
INTELLIGENT INSERT WITH INTEGRAL SENSOR

Subbiah Ramalingam, Roseville, and Darrell A. Frohrib, St. Paul, both of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Continuation of Ser. No. 35,038, Apr. 6, 1987, abandoned. This application Sep. 21, 1988, Ser. No. 248,298

Int. Cl.[5] B23B *27/00*

U.S. Cl. 407—120 **10 Claims**



1. A cutting insert for machining materials having a cutting edge, said cutting insert comprising a solid body, and a sensor integrally coupled directly to and carried by the insert to sense parameters at the cutting edge which are functions of the cutting phenomena acting on the insert, the sensor having means for providing output signals from the sensor generated by mechanical forces acting on the cutting insert, the sensor comprising a deposited thin film of piezo-electric material coupled to a cutting insert surface and spaced from an edge of such insert which contacts a workpiece, the piezo-electric layer having atomic level bonding with respect to the surface of the insert.

4,927,301

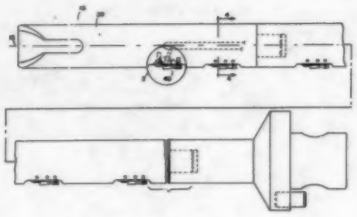
ADJUSTABLE BORING BAR CARTRIDGE

Lee Reiterman, Royal Oak, Mich., assignor to GTE Valenite Corporation, Troy, Mich.

Filed Dec. 27, 1988, Ser. No. 290,600

Int. Cl.[5] B31B *29/02, 29/14, 29/22*

U.S. Cl. 408—180 **14 Claims**



1. A boring bar assembly comprising a generally cylindrical body rotatable about a centrally disposed axis,

said body comprising a peripheral surface area and at least one recess,

an adjustable cartridge for receipt into said recess,

said recess having an axial length dimension and spaced walls substantially parallel with respect to each other and said axis,

said recess further including an arcuate seating surface which intersects said walls and opens radially to the periphery,

said cartridge comprising an anvil having a generally planar top face and a radiused bottom face cooperating with said arcuate seating surface to define a rotational adjustment path,

said top face further comprising axially spaced forward and rear portions,

said radiused face extending from said rear portion,

a pocket for receipt of a polygonal form lay down indexable insert,

means for adjusting said cartridge in said boring bar along said adjustment path,

means for preloading said anvil in said slot towards said adjustment means,

said rear portion having a first recessed area for receipt of said cartridge adjustment means,

said forward portion having a second recessed area for receipt of said preloading means,

said anvil having a center point about which said anvil rotates,

said insert having a cutting edge seated in said anvil with said edge spaced axially from said center point so to impart rotational force about said center point and loading on said bar adjustment means during operation, and

means for forcing said anvil toward at least one of said recess walls.

4,927,302

THREADING DEVICE

Robert A. Beaty, Rte. #1 Box 43-6, Jamestown, Tenn. 38556

Filed Sep. 14, 1988, Ser. No. 244,107

Int. Cl.[5] B23G *1/26, 5/00*

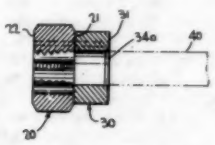
U.S. Cl. 408—221 **10 Claims**

1. A threading device for cutting threads in the outer surface of a round bar or tube which comprises

a die nut which defines an axis A and includes a plurality of radially-inwardly extending axial projections, each of said projections providing a set of axially spaced cutting threads thereon, said die nut also including two separated axial holes therein, and

a guide ring which defines an axis B and a flat front face, a

flat rear face, a cylindrical outer side surface which extends from said flat front face to said flat rear face, a cylindrical inner side surface which extends from said flat rear face towards said flat face, and an annular knurled surface which extends from said flat front face to said cylindrical inner surface said guide ring including two roll pins which extend away from said flat rear face in parallel with said axis B and which are extendable into said axial



holes in said die nut without play so as to easily detachably connect said guide ring with said die nut and cause said axis B to be coaxial with said axis A, said guide ring assuring proper alignment of a round bar or tube relative to the cutting threads of said die nut and said annular knurled surface thereof helping to guide an entry end of such round bar or tube into and through the guide ring and thereafter into said die nut.

4,927,303

BALL END MILL

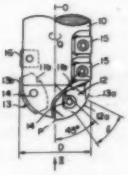
Osamu Tsujimura; Masaaki Nakayama, and Masayuki Okawa, all of Tokyo, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

Filed Sep. 26, 1989, Ser. No. 412,495

Claims priority, application Japan, Sep. 27, 1988, 63-126013[U]

Int. Cl.[5] B23B *51/00*; B23C *5/02*

U.S. Cl. 408—223 **3 Claims**



1. A ball end mill comprising:

a tool body rotatable around an axis and having a plurality of tip pockets formed in a forward end of said tool body, each of said tip pockets having a wall surface facing toward a rotational direction of said tool body;

a plurality of throw-away tips each having at least one arcuate cutting edge, the arcuate cutting edges of the respective throw-away tips describing a rotational locus when said tool body rotates around said axis;

a plurality of clamp bolts each of which is removably fastened to the wall surface of a corresponding tip pocket through a corresponding throw-away tip such that an end of the throw-away tip and an adjacent end of the adjacent throw-away tip in said rotational locus of said throw-away tips overlap with each other to form substantially a ¼ arc of said rotational locus;

the cutting edge of one of said throw-away tips and the cutting edge of the adjacent throw-away tip overlapping with each other, the center of the overlapping being located at a position that is substantially 45° from a forward end of the cutting edge along a ¼ arc of said rotational locus therefrom, and the overlapping length being ⅛ to ⅓ of a diameter of said rotational locus in an arcuate length thereof;

a planar section formed at a side surface of at least one of said plurality of throw-away tips, which is located at the forward end of said tool body, said side surface being located adjacent the forward end of the cutting edge of the throw-away tip; and

a planar surface formed at at least one of said tip pockets at a position facing toward said planar section, said planar surface being subject to a radial cutting force acting from the throw-away tip having said planar section, said planar section being abutted against said planar surface.

4,927,304

HOLDER FOR ROTARY MATERIAL REMOVING TOOLS

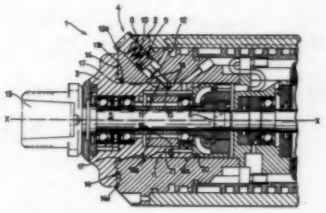
Hermann Hauser, Otto-Lilienthal-Strasse 4, D-7835 Teningen 3, Fed. Rep. of Germany

Filed Mar. 2, 1989, Ser. No. 317,727

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807102

Int. Cl.[5] B23C *1/00*

U.S. Cl. 409—231 **31 Claims**



1. A holder for rotary material removing tools and the like, comprising a housing including coaxial first and second sections; a tool supporting spindle having a torque-transmitting portion mounted in said first section; and means for releasably coupling said sections to each other end-to-end, including a plurality of male coupling elements mounted in one of said sections for movement between operative and inoperative positions, a female coupling device provided in the other of said sections to receive portions of said male coupling elements in operative positions of said male coupling elements, and motor means for moving said male coupling elements to at least one of said positions, said portions of said male coupling elements urging said first section axially toward said second section in the operative positions of said male coupling elements.

4,927,305

TIGHTENING DEVICE FOR THREADED CONNECTORS

Charles D. Peterson, Jr., P.O. Box 217, Richardson, Tex. 75080

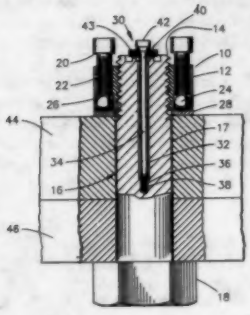
Filed Sep. 2, 1988, Ser. No. 240,151

Int. Cl.[5] F16B *31/12*

U.S. Cl. 411—14 **10 Claims**

1. In a tightening device having an elongated shank and an abutment head adapted to be tightened against a fixed support provided with an opening receiving said shank, and a plurality of jack bolts threadly engageable with a plurality of threaded holes positioned circumferentially about said abutment head and adapted to exert pressure against said support member, the improvement comprising a plurality of separate and discrete ball members closely receivable within said holes and posi-

tioned between bottom ends of said jack bolts and a wear plate supported by said support member, said ball members being



composed of a metal having a hardness greater than the bottom ends of said jack bolts.

4,927,306

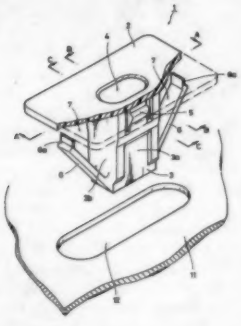
SCREW GROMMET

Seiichi Sato, Yokohama, Japan, assignor to Kato Hatsujo Kaisha, Ltd., Yokohama, Japan

Filed May 18, 1988, Ser. No. 195,905

Int. Cl.[5] F16B *19/00, 37/04*

U.S. Cl. 411—182 **10 Claims**



1. A screw grommet for insertion in an oblong fitting hole of a mounting panel, comprising:

an enlarged head adapted to abut against the mounting panel;

a shank extending from said head, said shank including a first pair of opposed walls and a second pair of opposed walls;

a pair of engaging shoulders adapted to engage first edges of the fitting hole, each one of said engaging shoulders extending from an associated one of said first pair of walls near the end of said walls closest to said head;

a pair of elastic arms, each one of said elastic arms having an end connected to an associated one of said second pair of walls near the end of said walls farthest from said head, each of said arms extending toward said head at a prescribed angle oblique to the plane of said associated one of said second pair of walls, a free end of each of said arms adapted to engage second edges of the fitting hole;

at least two ribs extending from said head in the direction of said shank, each of said ribs having a free end adapted to abut the mounting panel, said free ends and a surface of said head adjacent said shank defining a space;

packing material disposed within said space; and

a screw socket open at said head and extending into said shank, whereby said grommet will be retained within the fitting hole by said head, said engaging shoulders and said arms, and a screw can be inserted within said socket.

4,927,307

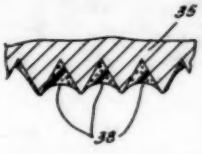
PATCH-TYPE SELF-LOCKING SCREW FASTENERS

Walter P. Fitzgerald; Beatrix Y. Sanders, both of San Diego, and Mansour A. H. Bagheri, Downey, all of Calif., assignors to Long-Lok Fasteners Corporation, Lancaster, Tex.

Continuation of Ser. No. 460,864, Jan. 25, 1983, abandoned, which is a continuation of Ser. No. 142,645, Apr. 22, 1980, abandoned, which is a continuation of Ser. No. 419,630, Nov. 27, 1973, abandoned, which is a division of Ser. No. 226,147, Feb. 14, 1972, Pat. No. 3,784,435, which is a continuation-in-part of Ser. No. 126,882, Apr. 19, 1971, abandoned, which is a division of Ser. No. 36,960, May 13, 1970, abandoned. This application Nov. 8, 1988, Ser. No. 268,578

Int. Cl.[5] F16B *39/00, 39/34*

U.S. Cl. 411—302 **6 Claims**



1. A self-locking metal screw-threaded fastener comprising:

a metallic fastener including a leading thread end and an element having a threaded portion including crests and valleys, said valleys including cooperating thread flanks located on each side of said crests;

a patch of crystallizable thermoplastic polymer having a lower crystallization rate than polyethylene directly bonded to said threaded portion and spaced from said leading thread end and extending around only a portion of the periphery of said threaded portion and operative upon assembly to a mating threaded member to tend to displace said threaded fastener laterally and in a direction opposite to said patch to effect locking by frictional engagement of the threads opposite said patch with the opposed threaded portion of the mating threaded member;

said patch including individual segments of said polymer in said valleys and adhered directly to the flanks on each side of said crests;

said segments being separated by said crests whereby the major diameter of said fasteners remains essentially unchanged and the leading thread end is essentially free of patch material;

said polymer having a maximum crystallization shrinkage of about 3% or higher by volume,

said polymer being a poly (alkene phthalate), and

said polymer in said patch having a reduced degree of crystallization shrinkage of about 25% or less of its maximum crystallization shrinkage.

4,927,308

FASTENING MEANS

Bernard DiMarco, Lilburn, and Steven A. Kaufman, Decatur, both of Ga., assignors to Siemens Energy & Automation, Inc., Alpharetta, Ga.

Filed Dec. 1, 1988, Ser. No. 278,628

Int. Cl.[5] F16B *37/00*

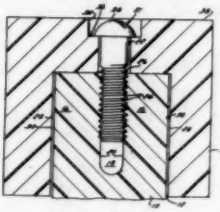
U.S. Cl. 411—437 **7 Claims**

1. An assembly for connecting two members comprising:

a one piece engagement receptacle including a first end

opening and a second end opening substantially smaller than the first end opening;

an engagement member including a slot defining at least two substantially parallel surfaces and an open end, wherein the engagement member is adapted to rest in the engagement receptacle such that the engagement member passes



through the first end opening and the open end abuts the engagement receptacle such that it is restricted from entering the second end opening; and

means for fixing the engagement member in the engagement receptacle, wherein the means engages the surfaces and the second end opening is adapted to accept the means.

4,927,309

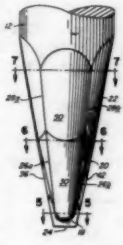
WIRE NAIL

Henry A. Sygnator, 22 S. Ridge Ave., Arlington Hts., Ill. 60005

Filed May 8, 1989, Ser. No. 348,732

Int. Cl.[5] F16B *15/00*

U.S. Cl. 411—439 **13 Claims**



1. A wire nail having a shank with opposite ends, a head formed on one of the ends, and a point formed on the other end, the shank defining an axis;

the point having a penetrating portion, which is blunt, a wedging portion, which merges with and tapers toward the penetrating portion, and a transitional portion, which merges with and tapers toward the wedging portion and merges with the last-mentioned end of the shank;

the wedging portion defining plural straight edges, each of which is inclined at a given angle relative to the axis defined by the shank;

the wedging portion having a plurality of convex surfaces, each of which conforms generally to a section of a circular cylinder, and two of which meet at each of said edges defined by the wedging portion;

the transitional portion defining plural straight edges, each of which meets a different one of said edges defined by the wedging portion, and each of which is inclined at a lesser angle relative to the axis defined by the shank; and

the transitional portion having a plurality of convex surfaces, each of which conforms generally to a section of a circular cylinder, and two of which meet at each of said edges defined by the transitional portion.

4,927,310

METHOD FOR AUTOMATICALLY JUSTIFYING, ASSEMBLING, AND BINDING BOOKS

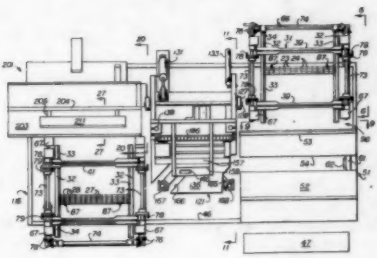
William H. Abildgaard, Redwood City, Calif.; Charles Chadwick, Old Saybrook, Conn.; Peter Hotkowski, Deep River, Conn., and Frank A. Todaro, Clinton, Conn., assignors to VeloBind, Inc., Fremont, Calif.

Division of Ser. No. 116,045, Nov. 2, 1987, Pat. No. 4,848,616.

This application Feb. 27, 1989, Ser. No. 315,490

Int. Cl.[5] B42B *5/08*

U.S. Cl. 412—7 **12 Claims**



1. A method for preparing books for binding which comprises the steps of:

providing a stack of sheets each formed with first holes spaced from but adjacent an edge of said sheets and spaced apart in intervals,

providing a male strip having projecting studs spaced the same intervals as said first holes,

providing a female strip having a plurality of second holes spaced the same intervals as said first holes,

assembling said sheets, male strip and female strip with said female strip on a first side of said stack and said male strip in an initial position on a second side of said stack opposite said first side with said studs pointed toward but spaced from said stack, said step of assembling said stack of sheets comprising supporting said stack of sheets horizontal and moving said stack of sheets horizontally onto a support surface, said support surface being initially horizontal and

pivoting said support surface to vertical position while loosely supporting said sheets,

jogging said sheets to align said first holes with themselves and with said second holes and studs,

pushing said studs through said first holes and then through said second holes,

and in which said step of assembling further comprises feeding said female strip into position on said first side in a longitudinal direction relative to said edge and feeding said male strip into position in a longitudinal direction relative to said edge on said second side.

4,927,311

SHIP UNLOADER WITH SCREW CONVEYOR SWINGABLE IN VARIOUS PLANES

Yoshio Kada, Nihama, Japan, assignor to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 228,662

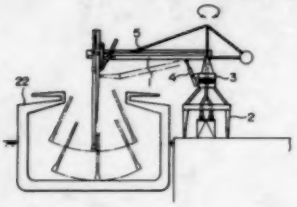
Claims priority, application Japan, Aug. 18, 1987, 62-203448

Int. Cl.[5] B65G *67/60*

U.S. Cl. 414—140.7 **1 Claim**

1. An unloader comprising: a boom having a head end; a boom conveyer disposed above said boom in such a manner as to extend in the longitudinal direction of said boom; a screw supporting frame mounted above the head end of said boom in such a manner as to be able to pivot about a longitudinal axis of said boom conveyor; a vertical screw conveyer supported by

said screw supporting frame in such a manner as to be swingable within a plane which is substantially parallel with a plane including the axis of rotation of said screw supporting frame; a portal-shaped frame supported on the head end of said boom in such a manner as to extend across and over said boom conveyer, said portal-shaped frame having upper opposite ends



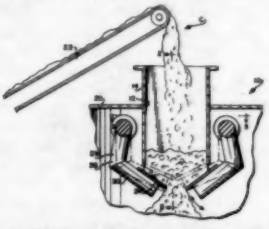
and being provided with rollers at said upper opposite ends; and an electric motor supported above said boom and having a shaft one end of which a pinion is fitted into; said screw supporting frame having circular-arc rails disposed in engagement with said rollers, and a circular-arc rack disposed in parallel with said rails and in meshing engagement with said pinion.

4,927,312

CHIP GATES WITH AIR LOCK

Michael D. Meredith; Joseph R. Phillips; Richard O. Laakso, and C. Bertil Stromberg, all of Glens Falls, N.Y., assignors to Kamyr, Inc., Glens Falls, N.Y.

Filed May 19, 1988, Ser. No. 195,890
Int. Cl.[5] B65G *69/00*
U.S. Cl. 414—221 **12 Claims**



1. Apparatus for feeding cellulosic chips, comprising:

a vessel, having top, bottom and side walls, for receiving the chips;

means carried by said vessel defining an inlet in the top wall of said vessel for continuously supplying chips thereto while simultaneously substantially precluding escape of gas from said vessel through said inlet including an inlet opening and a gate mounted in a single plane to support the chips and movable in said opening for varying the size of said opening, said gate having a surface and being movable into a position to support the chips in said opening in positions overlying said surface and overlying and occluding said opening to substantially preclude escape of gas through said inlet opening by the downward mass/flow of the chips while the chips are simultaneously supplied to the vessel through said inlet opening when the gate surface is in a downwardly directed supplying position; and

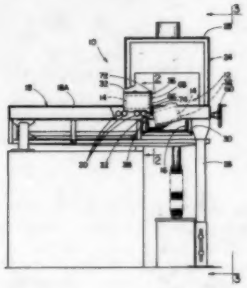
means responsive to the weight of the chips on said gate for varying the size of said opening while the chips are supplied through the opening while simultaneously maintaining a downward mass/flow of chips sufficient to preclude the escape of gas from the vessel through said inlet opening.

4,927,313

NUCLEAR FUEL PELLET SINTERING BOAT UNLOADING APPARATUS AND METHOD

Thomas B. Huggins, Columbia; Wade H. Widener, Cayce, and Kenneth K. Klapper, West Columbia, all of S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 21, 1989, Ser. No. 313,128
Int. Cl.[5] B65B *21/22*; B65G *65/23*
U.S. Cl. 414—414 **20 Claims**



14. A method for unloading nuclear fuel pellets from a sintering boat having an open top, said method comprising the steps of:

(a) pivoting a transfer housing loaded with the boat filled with nuclear fuel pellets about a generally horizontal axis from an upright position remote from a pellet deposit surface to an inverted position adjacent to the deposit surface to move the boat from an upright to inverted orientation with the pellets retained within the boat by a latched lid in a closed condition on the housing;

(b) unlatching the lid of the housing as the housing reaches its inverted position but engaging the unlatched lid with the deposit surface to retain it in its closed condition; and

(c) reverse pivoting the housing from its inverted position back toward its upright position to permit the unlatched lid to pivot from the closed condition to an opened condition thereby allowing pellets to slide out of the open top of the inverted boat and down the opened lid of the housing to the deposit site.

4,927,314

ENGINE VALVE FEED APPARATUS

Hideharu Sakimori, Hiroshima; Susumu Ihara, Higashihiroshima, and Hiroyuki Hayashi, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 17, 1989, Ser. No. 297,442
Claims priority, application Japan, Jan. 14, 1988, 63-3389[U]
Int. Cl.[5] B65G *1/06*; B23P *19/04*
U.S. Cl. 414—416 **6 Claims**

1. An apparatus for feeding engine valves to a valve handling apparatus at a valve pick-up station where said valve handling apparatus picks up and fits said engine valves to an engine cylinder head one after another, said apparatus comprising:

a valve hanger plate formed with a number of valve holes for tightly receiving a number of engine valves to hang said engine valves upside down;

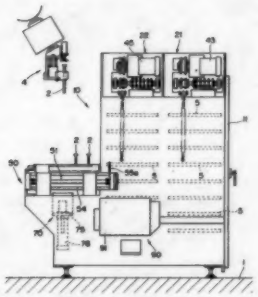
hanger plate transfer means for transferring a number of said valve hanger plates to said valve pick-up station one after another; and

thrust-up means disposed at said valve pick up station for thrusting up said valves from said valve hanger plate transferred to said valve pick-up station so as to allow said valve handling apparatus to hold a stem of each said engine valves, said thrust-up means comprising;

holding means movable up and down and formed with a

number of positioning holes for receiving therein the stem ends of said engine valves hung from said valve hanger plate to thereby hold said valves upright when moved up;

lift means for moving up and down said holding means; and



a stopper for preventing said valve hanger plate from being forced up when said holding means is moved up and receives said stem ends of said engine valves hung from said valve hanger plate.

4,927,315

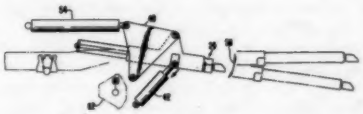
VEHICLE LIFTING AND TOWING APPARATUS

Ronald B. Nespor, Mercer, Pa., assignor to Chevron, Inc., Mercer, Pa.

Filed Mar. 6, 1989, Ser. No. 331,340

Int. Cl.[5] B60P *3/12*

U.S. Cl. 414—563 **12 Claims**



8. A vehicle lifting and towing apparatus as recited in claim 7, wherein said means for tilting said boom comprises third and fourth hydraulic cylinders pivotally mounted to said vehicle within the understructure thereof and said boom.

4,927,316

CARGO SPACE UTILIZATION

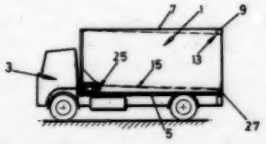
Wojciech J. Kordel, Great Budworth, United Kingdom, assignor to Joloda Plc., Liverpool, United Kingdom

Filed Jul. 15, 1988, Ser. No. 219,587

Claims priority, application United Kingdom, Jul. 18, 1987, 8716996

Int. Cl.[5] B60P *1/38*

U.S. Cl. 414—510 **9 Claims**



1. A box-like cargo holding body having a length, a roof line, a lintel which projects below the roof line, an underside of the lintel, a movable cargo loading surface, a loading aperture defined between the underside of the lintel and the movable cargo loading surface, a maximum permissible cargo load height dictated by a distance between the underside of the lintel and the movable cargo loading surface, which distance is fixed, and a moving floor to the body providing said movable cargo loading surface which moving floor has a constant slope over its length and is maintained at that slope such that it is at progressively reduced spacing from the roof line in a direction along its length from the loading aperture into the body and over the length of the body and wherein a minimum spacing is at least equal to the maximum permissible cargo load height.

4,927,317

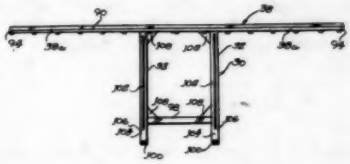
APPARATUS FOR TEMPORARILY COVERING A LARGE LAND AREA

Wilfred J. Acosta, Violet, La., assignor to Waste Management, Inc., Oak Brook, Ill.

Filed Sep. 1, 1988, Ser. No. 239,294

Int. Cl.[5] E02F *5/00*

U.S. Cl. 414—724 **12 Claims**



1. Apparatus for suspending a flexible cover a spaced distance from a front loader bucket of an earth-moving vehicle, comprising:

a cross member having opposed free ends and an intermediate portion;

a pair of spaced apart rearwardly extending extension arms joined at one end to the intermediate portion of the cross member and having second, opposed free ends;

means at the second ends of the extension arms for mounting the extension arms to the front loader bucket;

a lateral member extending between the extension arms adjacent the free ends thereof;

upstanding reinforcing spines upwardly extending from the extension arms and having free ends spaced from the free ends of the extension arms; and

means for releasably supporting the flexible cover at a series of spaced locations along said cross member.

4,927,318

METHOD FOR FORMING, GRASPING AND HANDLING CUBES OF STACKED PRINTED PRODUCTS

William Hayden, Easton; Mark W. Hayden, Monroe, and Richard S. White, Old Saybrook, all of Conn., assignors to Galpin Research, Limited Partnership, Stratford, Conn.

Filed Feb. 9, 1988, Ser. No. 153,992

Int. Cl.[5] B65B *35/56*

U.S. Cl. 414—786 **21 Claims**

9. The method of assembling and handling printed products, wherein each printed product previously has been folded to form a spine and has a rectangular shape with the spine extending along a longer edge of the rectangular shape with the other longer edge of the rectangular shape being the "lap" edge, said method of assembling and handling such printed products comprising the steps of:

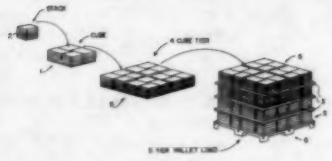
stacking such printed products into four stacks of similar height with each of said stacks having four sides;

during the formation of each stack positioning the spines of a multiplicity of successive printed products in each stack

along one longer side of the stack while positioning the lap edges of said multiplicity along the other longer side of the stack, thereby providing two longer sides on each of said four stacks and two shorter sides on each of said four stacks;

providing a cube builder station;

placing said four stacks in said cube builder station with a longer side of each stack oriented at 90° to a longer side of both of its adjoining stacks and with a shorter side of each



stack facing a longer side of an adjoining stack to form a "cube" and with a longer side of each stack on an exterior side surface of said cube being aligned with a shorter side of an adjoining stack on the exterior side surface of said cube for providing a square exterior shape of said cube as seen from above said cube with a square central opening in said cube as seen from above said cube; and

grasping, lifting and removing said cube as a unit from said cube builder station.

4,927,319

DEVICE FOR DETERMINING A PRESET NUMBER OF CONTAINERS, PARTIALLY INSERTED WITHIN ONE ANOTHER FORMING A PACKAGE OF THE SAME CONTAINERS

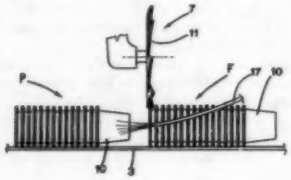
Gian Luigi Montali, Vignola, Italy, assignor to S.T.S. SRL, Anzola Emilia, Italy

Filed Jul. 20, 1988, Ser. No. 221,863

Claims priority, application Italy, Aug. 3, 1987, 4934/87[U]

Int. Cl.[5] B65G *59/10*

U.S. Cl. 414—788.4 **3 Claims**



1. A device for determining a preset number of containers that are partially inserted within one another to form a package of the same containers, said device comprising first means for moving a row of said containers; second means for guiding said row; third means for effecting a forward movement of said containers one at a time in relation to said row in order to form a package of said containers; fourth means for pushing said package in a forward direction; with the said third means comprising a circular disc that is located above the said row so that said row strikes with its front against a lower part of the peripheral rim of said disc, said peripheral rim of said disc being divided into a series of sectors, each sector being turned through a predetermined angle with respect to a plane which contains said disc's center; said disc being able to rotate around a central axis parallel to said row, in a predetermined direction, causing said sectors to be one by one inserted between contiguous edges of a pair of said containers at said front of said row, in order to separate said containers from one another by imposing a forward movement on said first container, and retaining said second container in the row.

4,927,320

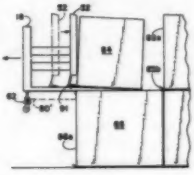
AUTOMATIC LOAD PUSH-PULL SLIPSHEET HANDLER

John E. Olson, Portland, Oreg., assignor to Cascade Corporation, Portland, Oreg.

Continuation of Ser. No. 154,646, Feb. 9, 1988, Pat. No. 4,861,223. This application Jul. 14, 1989, Ser. No. 379,821

Int. Cl.[5] B66F *9/20*

U.S. Cl. 414—786 **7 Claims**



1. A method of handling a load by using a vehicle-supported push-pull slipsheet handler having a load-carrying member for supporting a load and a push-pull assembly comprising a frame, a push plate, a selectively-actuated power apparatus mounted on said frame for extending and retracting said push plate relative to said frame along a direction of extension, and a selectively openable and closable jaw on said push plate for gripping a slipsheet, said method comprising:

(a) supporting a first load on said load-carrying member;

(b) determining whether or not said first load is to be deposited atop a second load;

(c) sensing, by means of a sensor asembly mounted on said push-pull slipsheet handler, the presence of a vertically-oriented surface located beyond said push-pull slipsheet handler in said direction of extension and the distance, along said direction of extension, between said surface and a predetermined portion of said push-pull assembly;

(d) selectively controlling said vehicle in response to steps (b) and (c) as follows:

(1) if said first load is to be deposited atop said second load, controlling said vehicle in response to said sensor assembly so as to move said portion of said push-pull assembly to a first position where said portion is separated by a first predetermined distance from said vertically-oriented surface, and stopping said vehicle when said first position is reached or, alternatively,

(2) if said first load is not to be deposited atop said second load, controlling said vehicle in response to said sensor assembly so as to move said portion of said push-pull assembly to a second position where said portion is separated by a second predetermined distance, greater than said first predetermined distance, from said vertically-oriented surface, and stopping said vehicle when said second position is reached; and

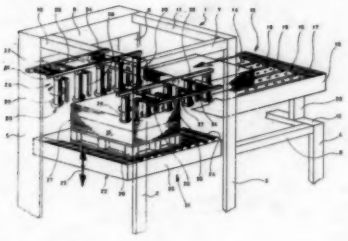
(e) thereafter, depositing said first load by actuating said power apparatus to extend said push plate while moving said vehicle in a direction opposite to said direction of extension.

4,927,321

DEVICE FOR STACKING BATCHES OF FLAT OBJECTS IN A VERTICAL FILE

Raymond Lucas, Villandraut, France, assignor to Bobst SA, Switzerland

Filed Aug. 3, 1988, Ser. No. 227,637
Claims priority, application France, Aug. 5, 1987, 87 11187
Int. Cl.[5] B65H *29/40, 31/20, 31/30*
U.S. Cl. 414—788.9 6 Claims



1. In a piling device for flat objects arranged batchwise, especially folded boxes of corrugated board or non-folded blanks of boxes arranged in successive layers on any sort of loading plane, said device including a frame containing infeed means for conveying the batches into the device on a conveying axis, means for carrying a layer of batches from the infeed means to a point above a vertically movable loading plane, means for retaining and then laying down the layer on top of said loading plane, means for laterally guiding of the layer as the layer is being laid down onto the loading plane, stop means for positioning a front edge of each layer in said means for carrying and means for vertically shifting said loading plane, the improvements comprising said infeed means for the batches being made up of a table having motor-driven rollers with axles, said rollers cooperating with a lateral baffle arranged at right angles to the axles of said motor-driven rollers, said means for carrying a layer of batches to a point above the vertical moving loading plane consisting of two rows of spaced apart motor-driven, vertically arranged rollers for engaging opposite sides of the layer to be carried forward, mounting means for adjustably positioning said two rows in said frame laterally to said conveying axis, said mounting means including two supporting bars being movable in the frame by a setting appliance, a longitudinal beam for mounting each row of rollers, each beam being connected by air cylinders to one of said supporting bars to move therewith, said means for retaining and then putting down said layer including a retaining appliance operating jointly with each vertically arranged roller and a support operating jointly with said two rows, said means for laterally guiding said layer consisting of vertical batch guides being mounted on said supporting bars to extend within spaces existing between the vertically arranged rollers of said rows, said stop means comprising a front stop plate having an adjustable size as required by the size of said batch, and said lateral baffle being secured to an extension of one of said rows situated on the side of the conveying axis.

4,927,322

STACK STRIPPER FOR A STACKING MACHINE

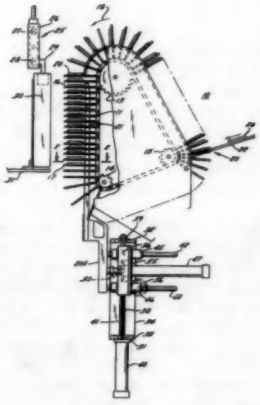
Werner Schweizer, Boynton Beach; Daniel J. McGuire, Ft. Lauderdale, and Edward D. Archer, Lantana, all of Fla., assignors to Curt G. Joa, Inc., Sheboygan Falls, Wis.

Filed May 8, 1989, Ser. No. 349,119
Int. Cl.[5] B65G *25/00*
U.S. Cl. 414—794.7 7 Claims

1. A stripper device for stripping articles from the conveyor of an article stacking machine, the conveyor comprising: closed loop flexible means driven lengthwise continuously, a series of paddle members disposed along the length of said flexible means, said paddle members having corresponding inside ends connected to said flexible means and extending outwardly therefrom for articles to be deposited on said paddle members at one location and for a series of articles to be accumulated on said paddle members, respectively, where a series of generally vertically moving paddle members are above and below each other at another location to facilitate stripping said articles from said paddle members to form a stack of articles, said stripper device comprising:

a vertically extending stripper bar for stripping simultaneously said articles from a predetermined number of continuously downwardly moving paddle members by way of said bar moving transversely to the path of said moving paddle members from the uppermost position of said bar inwardly of said paddle members to a position outwardly of said paddle members,

a carriage and a first fluid pressure responsive actuator connected to said carriage and operative in one mode to raise said carriage to an uppermost position,



means for mounting said stripper bar on said carriage for being moved substantially horizontally and a second fluid pressure responsive actuator operatively connected to said stripper bar for moving said bar cyclically outwardly away from said paddle members and inwardly of said paddle members,

a vertically extending gear rack mounted to said carriage,

a gear meshed with said gear rack and a rotatable shaft supporting said gear for rotation,

a clutch having power input and output means and means for driving said input means at a speed which is proportional to the speed at which said paddle members are moving downwardly,

means coupling said power output means of the clutch to said gear such that when said clutch is activated said gear is rotated to drive said carriage and the stripper bar mounted thereto downwardly at the same speed at which said paddle members are moving downwardly, and

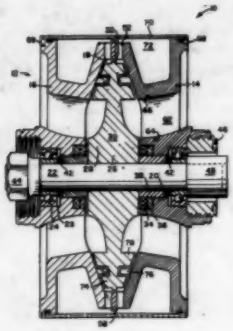
control means for controlling operating of said clutch and said fluid responsive actuators.

4,927,323

RADIAL FLOW FLUID PRESSURE MODULE

Robert R. Kimberlin, Athens, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Dec. 28, 1988, Ser. No. 291,184
Int. Cl.[5] F01D 3/02
U.S. Cl. 415—98 **12 Claims**



1. A radial flow fluid pressure module comprising:
a symmetric housing assembly formed by two mateable housing members and having a hollow rotor chamber formed between the mated housing members;
radial openings in the radial periphery of said rotor chamber through each housing member;
opposed annular passages axially extending from the inner portion of said rotor chamber through each housing member;
a shaft supported for rotation in said housing assembly;
a rotor having opposed faces and mounted on said shaft for rotation with said shaft in said rotor chamber;
at least one circular row of axially cantilevered blades mounted on each face of said rotor;
a least one set of integrally formed nozzles axially extending from each housing member and arranged radially concentric and adjacent to a respective row of rotor blades such that each set of nozzles is in fluid communication with said respective row of rotor blades;
a plurality of radially directed flow paths defined by said rotor and said housing members; and
an annular plenum chamber circumferentially surrounding said housing assembly, in fluid communication with said radial openings, and further comprising:
a pair of annular flanges, one flange extending radially outward from each housing member; and
a cylindrical member in circumferential sealing contact with both flanges.

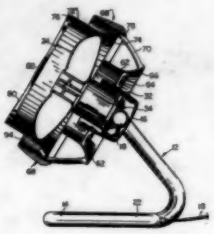
4,927,324

DUCTED FAN

Michael C. Coup; Gary P. Israel, both of Wichita; Glen W. Ediger, Newton, and Donald J. Moore, Wichita, all of Kans., assignors to Vornado Air Circulation Systems, Inc., Wichita, Kans.

Filed Jan. 9, 1989, Ser. No. 294,780
Int. Cl.[5] F04D 29/70
U.S. Cl. 415—121.2 **15 Claims**

1. A ducted fan comprising:
a base member with a motor and bladed impeller attached to the base;
a funnel-shaped duct with its large end facing upstream concentrically positioned upstream of the blades and around the motor and connected thereto;
an outer cowling concentrically positioned, connected to the funnel-shaped duct through a series of radial ribs;
a inner cowling positioned inside the outer cowling and attached thereto, the inner cowling being circular in lateral cross section and tapered longitudinally in shape from its larger diameter intake end to its lesser diameter discharge end;
a circular grill having an outer radius attached to the dis-



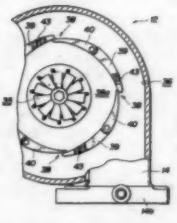
charge end of the inner cowling, the grill including a center hub and a series of arcuate shaped ribs extending outwardly from the hub to said outer radius, each rib having a constant curvature radius and each rib being equally spaced from each other around the hub, the maximum lateral spacing between the ribs is inboard from said outer radius; and
a support means pivotally attached to said motor and base member.

4,927,325

VARIABLE-DISPLACEMENT TURBINE

Shunji Yano, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 14, 1989, Ser. No. 338,984
Claims priority, application Japan, Apr. 15, 1988, 63-94073
Int. Cl.[5] F01D 17/14
U.S. Cl. 415—161 **9 Claims**



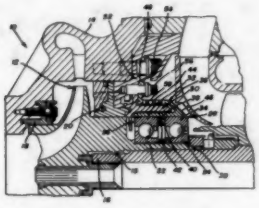
1. A variable-displacement turbine comprising:
a housing;
a turbine wheel disposed in said housing;
a scroll passage defined in said housing around said turbine wheel;
at least one fixed vane and at least one movable vane disposed between said scroll passage and said turbine wheel and arranged alternately as an annular array in the direction of rotation of said turbine wheel;
a variable nozzle jointly defined by said vanes and having an opening adjustable in response to angular movement of said movable vane; and
at least one of said fixed vane and said movable vane having a bypass passage defined therein in bypassing relation to said variable nozzle.

4,927,326

TURBOMACHINERY ROTOR SUPPORT WITH DAMPING

George L. von Pragenau, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 26, 1989, Ser. No. 364,743
Int. Cl.[5] F01D *11/08*
U.S. Cl. 415—170.1 24 Claims



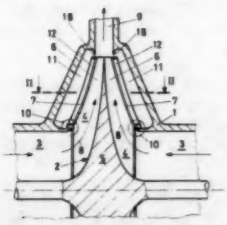
1. In high speed turbomachinery having a housing containing a pressurized working fluid, an axially elongated rotatable member supported by ball bearing means within said housing, said ball bearing means including an inner race fastened to said rotatable member for rotation therewith and an outer race, bearing supporting and damping means comprising: an annular sleeve disposed about said outer race including a radially inner portion having a tightly abutting fit with said outer race, and a radially outer portion spaced from said inner portion, means for securing said sleeve to said housing, a support member fixed to said housing having an annular rim disposed intermediate said inner portion and said outer portion and providing a gap with said inner portion, said gap being substantial relative to said fit with said outer race, said fluid having a pressure differential across said support member and said sleeve so that fluid may flow into and fill said gap, and a plurality of radial slits spaced axially and circumferentially about said outer portion of said sleeve for providing said sleeve axially and radially flexible.

4,927,327

CONTACTLESS CENTRIFUGAL SEAL DEVICE FOR A ROTATING MACHINE PART

Jakob Keller, Dottikon, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland

Continuation of Ser. No. 84,022, Aug. 11, 1987, abandoned. This application Dec. 12, 1988, Ser. No. 283,281
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1986, 3627778
Int. Cl.[5] F01D *5/14*; F04D *29/08*; F16J *15/40*
U.S. Cl. 415—171.1 7 Claims



1. A contactless centrifugal seal device for a rotating machine part in a gaseous compressor, which part has an interior space for guiding a gas to be compressed, said part being supported so that it can rotate within a casing such that a low pressure vortex space exists between the casing and the rotating part, said rotating part further including an external rotation surface for separating the interior space from the low pressure vortex space, narrow annular gaps exist between the rotating machine part and the casing at opposite ends of the vortex space, the vortex space between the ends having a width that is a measure of the shortest distance between said external rotation surface along any point thereon between said ends and a surface of said casing opposing the respective point on said external rotation surface, said annular gaps interconnecting the low pressure vortex space and the interior space of the rotating machine part, one of said annular gaps having a first diameter and a second of said annular gaps having a second diameter larger than the diameter of the one annular gap, the seal device comprising:

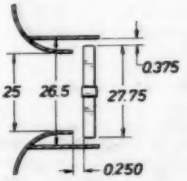
fin means provided on the external rotation surface from the one annular gap to the second annular gap and extending into the low pressure vortex space for creating a vortex in the low pressure vortex space that is sufficient to create a pressure rise in the low pressure vortex space that is substantially equal to a pressure rise in the interior space during operation of the compressor, said fin means extending into the low pressure vortex space for a distance that is less than half of the width of the low pressure vortex space.

4,927,328

SHROUD ASSEMBLY FOR AXIAL FLOW FANS

William D. Scoates, and Samuel W. Scoates, both of Rte. 1, Box 930, Bryan, Tex. 77803

Continuation-in-part of Ser. No. 317,903, Mar. 2, 1989. This application Nov. 1, 1989, Ser. No. 430,185
Int. Cl.[5] F04D *29/68*
U.S. Cl. 415—220 3 Claims

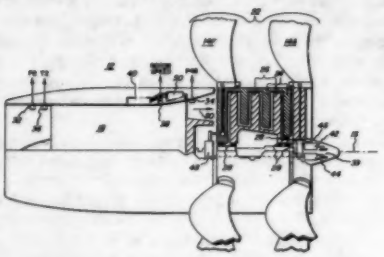


1. An axial fan comprising a hub, means supporting the hub for rotation around the longitudinal axis of the fan, a plurality of impeller blades attached to the hub and extending radially from the axis of rotation, a shroud assembly including a band encircling the blades and spaced from the tips of the blades a sufficient distance to provide ample clearance to avoid contact between the blades and the band during shipment and operation of the fan, said shroud further including an orifice positioned upstream of the blades, said band having a diameter that is about 106% of the diameter of the orifice means for preventing air from flowing between the orifice and the band, said orifice having a downstream end located adjacent to but spaced from the impeller blades, said impeller blades having a diameter that is about 103% of the diameter of the orifice so that the impeller blades extend outwardly from the hub beyond the orifice to reduce the flow of air over the tips of the impeller blades substantially while providing ample clearance between the tips of the impeller blades and the band.

4,927,329
AIRCRAFT ENGINE UNDUCTED FAN BLADE PITCH CONTROL SYSTEM

Gerald B. Kliman, Schenectady, and Donald W. Jones, Burnt Hills, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 21, 1988, Ser. No. 260,645
Int. Cl.[5] B64C 11/44
U.S. Cl. 416—127 **19 Claims**



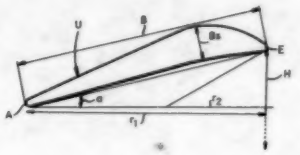
1. Aircraft propulsion apparatus, comprising:
(a) a gas generator for generating a gas stream and containing therein compressor means for driving a rotatable shaft;
(b) first and second coaxially situated rotatable members;
(c) a plurality of first and second rotor blades affixed to said first and second rotatable members, respectively, said first and second rotor blades being positioned such that a gas stream, when produced by said gas generator, impinges thereon and causes said first and said second rotatable members to counterrotate;
(d) a plurality of forward and aft variable pitch propulsor blades coupled to, and extending radially outwardly of, said first and second rotatable members, respectively;
(e) gear means coupled to said propulsor blades;
(f) electric motor means, including rotor means, mounted in stationary fashion relative to said rotatable members;
(g) means coupling said rotor means to said gear means such that rotation of said rotor means effects a pitch change of said propulsor blades;
(h) electrical generator means coupled to said rotatable shaft for generating electrical power; and
(i) circuit means coupling said electrical generator means to said motor means, said circuit means including control means responsive to a desired propulsor blade pitch command for controlling said motor means to force each of said blades to a respective desired blade pitch.

4,927,330
AIR PROPELLER

Oscar Asboth, Schlösselgasse 2, A-1080 Vienna, Austria

Continuation-in-part of Ser. No. 916,813, Oct. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 641,451, Aug. 16, 1984, abandoned. This application Jun. 24, 1988, Ser. No. 212,049
Claims priority, application Austria, Aug. 17, 1983, 2949/83
Int. Cl.[5] B64C 11/18
U.S. Cl. 416—223 R **4 Claims**

1. In a drive system for propelling a land or water vehicle at a reduced speed by rotation of a propeller in the air with a high slip of approximately at least 60% and having a quality coefficient of at least 70% for 100% slip, the improvement wherein
the propeller is of substantially constant pitch;
the propeller is rotated about an axis and the aerodynamic center of pressure is located at a distance from the propeller axis equal to approximately three-fourths of the radius of the propeller;
the angle of the blade inclination decreases continuously as the diameter of the propeller increases;
the thickness of the blade is greatest in the leading third of the width of the blade;
the propeller has a leading edge and a trailing edge and the leading edge has a radius of curvature that is greater seen in cross section than the radius of curvature of the trailing edge, the radius of curvature of the trailing edge being smallest in the area of approximately the outermost third of the propeller;

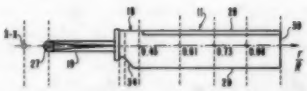


the propeller has a suction surface that has a shape when seen in cross section that is an essentially straight line in the area between the region of greatest blade thickness and the trailing edge;
the ratio of the diameter of the propeller to its pitch is approximately 1.18 to 2.9 times the value of the quality coefficient; and
the blade width of the propeller is 0.09 to 0.19 times the pitch of the propeller, the pitch being the axial propeller displacement with no slip.

4,927,331
BLADE FOR HIGH-PERFORMANCE SHROUDED PROPELLER, MULTI-BLADE SHROUDED PROPELLER PROVIDED WITH SUCH BLADES AND TAIL ROTOR ARRANGEMENT WITH SHROUDED PROPELLER FOR ROTARY WING AIRCRAFT

Alain E. Vuillet, Bouc Bel Air, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Feb. 28, 1989, Ser. No. 317,286
Claims priority, application France, Mar. 7, 1988, 88 02873
Int. Cl.[5] B63H 1/26
U.S. Cl. 416—238 **12 Claims**



1. A blade for shrouded propeller comprising a tunnel and a rotor with multiple blades coaxial to said tunnel, said rotor comprising a rotating hub of which the radius is of the order of 40% that of said tunnel and on which said blades are mounted via blade shanks, wherein:
in plan, the aerodynamically active part of said blade presents, beyond the blade shank, a rectangular shape with the result that the successive profiles constituting said aerodynamically active part all have the same chord 1 and that the end section of said aerodynamically active part is straight; and,
along the span of the blade counted from the axis of the tunnel, between a first section of which the relative span is close to 45% and the end section of said blade:
the maximum relative camber of the successive profiles constituting said aerodynamically active part of the blade is positive and increases from a value close to 0 to a value close to 0.04;
the twist of said aerodynamically active part of the blade

decreases from a first value close to 12° at said first section to a second value close to 4° at a second section of which the relative span is close to 0.86, then increases from this second section to a third value close to 4.5° at said end section of blade; and

the maximum relative thickness of said successive profiles decreases from a value close to 13.5% to a value close to 9.5%.

4,927,332

VANE PUMP

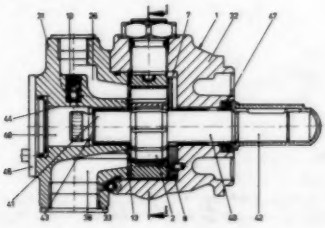
Horst Fischer, Lohr, and Karl Staub, Frammersbach, both of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Apr. 16, 1986, Ser. No. 852,714

Claims priority, application Fed. Rep. of Germany, Apr. 17, 1985, 3513923

Int. Cl.[5] F04B *49/08*

U.S. Cl. 417—299 **5 Claims**



1. A vane-type pump comprising:

a housing,

a rotor,

a plurality of vanes supported by said rotor,

a rotor shaft onto which said rotor is mounted,

a leakage oil space defined in said housing,

said rotor shaft having a first end and a second end, said first end ending within said housing and defining a border of said leakage oil space, said second end extending out of said housing and forming a shaft pin for driving said shaft,

said housing defining a suction space and a pressure space, said suction space and said pressure space being operatively coupled to vane chambers formed by said vanes,

a pressure port bore defined in said housing and coupled to said pressure space, said pressure port bore having a longitudinal axis, and

a venting valve disposed within said housing immediately adjacent said pressure port bore and having an inlet directly coupled to said pressure port bore and an outlet coupled to said leakage oil space,

a longitudinal axis of said venting valve being parallel to said axis of said pressure port bore such that a direct connection can be provided between the pressure port bore and leakage oil space.

4,927,333

FLUID PUMP

Kichiro Kato, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jan. 17, 1989, Ser. No. 297,969

Claims priority, application Japan, Jan. 22, 1988, 63-10881; Jun. 20, 1988, 63-150014

Int. Cl.[5] F04B *35/00*

U.S. Cl. 417—316 **8 Claims**

1. A fluid pump comprising:

a housing having an inlet and an outlet;

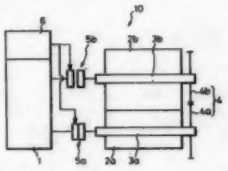
a pair of rotors rotatably arranged in the housing and engaged with each other;

a pair of rotor shafts supporting the rotors, respectively, and rotatably arranged in the housing;

identical mating gears provided on the rotor shafts, respectively, and in mesh with each other;

a rotary drive for driving either of the rotor shafts to rotate the rotors;

a first clutch means provided between the rotary drive and one of the rotor shafts to transmit the rotation of the rotary drive to the rotor shaft;



a second clutch means provided between the rotary drive and the other rotor shaft to transmit the rotation of the rotary drive to the other rotor shaft, when activated;

a clutch operating means which selectively operates one of the first clutch means and the second clutch means to change the drive-driven relationship between one of the rotor shafts and the other of the rotor shafts.

4,927,334

LIQUID PUMP DRIVEN BY ELEMENTS OF A GIANT MAGNETOSTRICTIVE MATERIAL

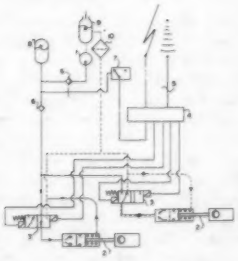
Göran Engdahl, Täby, and Gunnar Molund, Västeras, both of Sweden, assignors to ABB Atom AB, Västeras, Sweden

Filed Dec. 9, 1988, Ser. No. 282,271

Claims priority, application Sweden, Dec. 10, 1987, 8704931

Int. Cl.[5] F04B *17/00*

U.S. Cl. 417—322 **5 Claims**



1. A pump for liquids driven by magnetostrictive rods, comprising:

a housing including a piston space therein;

a piston mounted for reciprocating movement along an axis extending within said piston space;

at least one pair of magnetostrictive rods including first and second rods made of a magnetostrictive material and mounted to engage with, said piston along said axis; and

coils surrounding each of said first and second rods adapted to generate magnetic fields such that motion is imparted to said piston in one direction along said axis with said first rod being deformed and simultaneously therewith said second rod dynamically prestressing said first rod, and such that motion in the opposite direction to said one direction is imparted to said piston with said second piston being deformed and simultaneously therewith said first

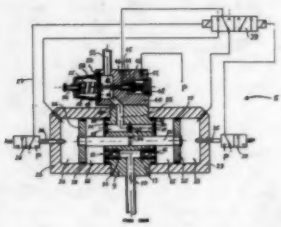
rod dynamically prestressing said second rod, whereby said piston moves with a reciprocating movement.

4,927,335

PUMP FOR TRANSFERRING LIQUIDS, IN PARTICULAR BEER OR CARBONATED BEVERAGES

Carlo M. Pensa, Esino Lario, Italy, assignor to O.D.L. S.r.l., Como, Italy

Filed Oct. 28, 1988, Ser. No. 264,264
Claims priority, application Italy, Nov. 4, 1987, 22509 A/87
Int. Cl.[5] F04B *43/06*
U.S. Cl. 417—393 6 Claims



1. A pump for transferring pressurized liquids, in particular for beer or carbonated beverages comprising:

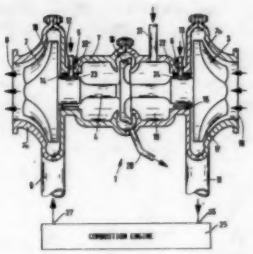
a central body having a rod reciprocable through said central body; first and second mutually opposite pistons on said rod, which pistons reciprocate integrally; said pistons sliding inside first and second cylinders, respectively, on opposite sides of said central body, whereby said pistons define, with their reciprocating motion, four variable-volume chambers, with a first and a second such chamber being located in said first cylinder on opposite sides of said first piston and with a third and a fourth such chamber being located in said second cylinder on opposite sides of said second piston; each of said first and third chambers having a liquid inlet and a liquid outlet; liquid being intaken alternately into said first and third chambers through said inlet through first valve means, said liquid being delivered alternately from said third and first chambers through said outlet under control of said first valve means; said delivered liquid being delivered alternately from said first and third chambers by a gas alternatively flowing into said second and fourth chambers respectively; a gas pressure regulator which modulates gas pressure in said second and fourth chambers and wherein pressure of the delivered liquid counteracts a calibration force in said gas pressure regulator, said gas alternatively acting, by control means inside of said second and fourth chambers to maintain a substantially constant and predetermined delivery pressure of said liquid and whereby said delivery pressure of said delivered liquid from one of said first or third chambers is obtained as the sum of a thrust exerted by liquid intaken in the other of said first or third chambers, plus the modulated gas pressure acting as a thrust on a face of the piston in said second or fourth chamber.

4,927,336

DRIVE SYSTEM INCLUDING AN ENGINE AND A TURBO-CHARGER

Axel Rossmann, and Werner Huether, both of Karlsfeld, Fed. Rep. of Germany, assignors to MTU Motoren-Und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany

Filed Dec. 7, 1987, Ser. No. 129,703
Claims priority, application Fed. Rep. of Germany, Dec. 10, 1986, 3642121
Int. Cl.[5] F04B *17/00*
U.S. Cl. 417—407 12 Claims



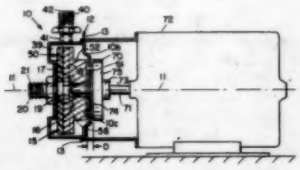
1. A drive system comprising a combustion engine, a cooling water circulating circuit for said combustion engine, a turbo-charger for said combustion engine, said turbo-charger including a compressor section, a turbine section, and housing means for said turbine section and for said compressor section, a shaft in said housing means for interconnecting said compressor section and said turbine section, sleeve bearing means for supporting said shaft in said housing means, water supply means interconnecting said housing means and said cooling water circulating circuit of said combustion engine for supplying cooling water as a lubricant to said sleeve bearing means, cooling water discharge means connecting said housing means back to said cooling water circulating circuit of said combustion engine for removing water from said housing means, a water pump wheel mounted on said shaft in said housing means between said compressor section and said turbine section for simultaneously circulating cooling water through said cooling water supply means, through said housing means, through said sleeve bearing means, through said cooling water discharge means and through said cooling water circulating circuit of said combustion engine, thereby avoiding a separate cooling pump for said combustion engine.

4,927,337

MAGNETICALLY DRIVEN PUMP

Ferdinand Lustwerk, Page Rd., Lincoln, Mass. 01773

Continuation of Ser. No. 904,409, Sep. 8, 1986, abandoned. This application Jun. 6, 1988, Ser. No. 202,270
Int. Cl.[5] F04B *17/00*
U.S. Cl. 417—420 11 Claims



1. A magnetically driven centrifugal pump comprising,

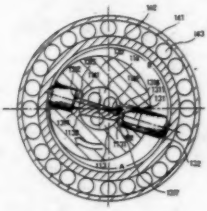
(a) a magnetically driven rotor having a front face and a back face,
(b) a sealed housing enclosing said rotor and having a front wall, a back wall and a peripheral wall,
(c) said rotor being carried on an axle inside said housing, said axle being attached at one end thereof only to said housing back inside wall so that said rotor rotates freely on said axle, which defines an axis of rotation of said rotor, and extends cantilevered from said housing back inside wall, the rotor back face being adjacent said housing back inside wall and said rotor front face being adjacent said housing front inside wall,
(d) fluid impellers attached to said rotor that extend generally radially from said axis of rotation in the space between said rotor front face and said housing front inside wall,
(e) a fluid input passage through said housing front wall for fluid flow into said housing,
(f) a fluid output passage for fluid flow out of said housing through said peripheral wall,
(g) one or more straight permanent rotor magnets carried on said rotor and oriented thereon each with its north (N) and its south (S) magnetic poles on the same radial line from said axis of rotation,
(h) means external of said housing that magnetically couples with said rotor magnet through at least one wall of said housing including one or more external drive magnets oriented therein each with its north (N) and its south (S) magnetic poles on the same radial line from said axis of rotation and said external drive magnets and said rotor magnets polarities are oriented so that each drive magnet exerts a magnetic force of attraction on a rotor magnet and said force of attraction is generally parallel to said axis of rotation and
(i) means for driving said coupling means in rotation,
(j) whereby said driving means drives said rotor impellers which compels fluid flow from said input passage to said output passage.

4,927,338

RADIAL PISTON PUMP

Yoshiaki Ito, Kariya; Kougi Nagai, Anjo; Akihiko Sawada, Toyohashi, and Hideyuki Koike, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 29, 1988, Ser. No. 162,205
Claims priority, application Japan, Mar. 2, 1987, 62-47194; Dec. 25, 1987, 62-331338
Int. Cl.[5] F04B *1/04*
U.S. Cl. 417—462 **17 Claims**



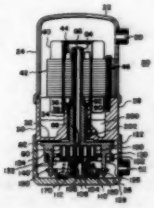
1. Radial piston pump comprising:
a housing having a cylindrical suction chamber therein;
a shaft rotatably provided within said housing, a longitudinal axis of said shaft being off-set from a center axis of said suction chamber by predetermined amount;
a pump column provided within said suction chamber of said housing, a longitudinal axis of said pump column is coaxial with the longitudinal axis of said shaft, said pump column having a suction groove on an outer surface thereof, a suction path connecting said suction groove to said suction chamber, a discharge groove formed on the outer surface thereof and the discharge path connecting said discharge groove to an outside of said pump column;
a rotor rotatably provided on said pump column, said rotor having a first and a second cylinders therein, each of said first and second cylinders aparting from each other by 180 degree;
a first and a second pistons each of which is slidably provided within each of said first and second cylinders;
a bearing provided within said suction chamber of said housing between said housing and said rotor, said bearing having an outer race fixing to said housing and an inner race to which a top end of said piston abuts; and
coupling transmitting the rotation of said shaft to said rotor wherein;
wherein the relation within a starting point and a finishing point of said suction groove, a starting point and a finishing point of said discharge groove and opening ports of said first and second cylinders is designed in such a manner that;
a rear end point of said opening port of said first cylinder functionally fits to said finishing point of said discharge groove and there exists a first predetermined angle θ_1 between a front end point of said opening port of said first cylinder and said starting point of said suction groove at a first position when said first piston locats a bottom dead point;
said front end point of said opening port of said first cylinder fits to said starting point of said discharge groove and there exists a second predetermined angle θ_2 between a rear end point of said opening port of said second cylinder and said finishing point of said suction groove at a second position when said rotor rotates by said first predetermined angle θ_1 from said first position;
said rear end point of said opening port of said second cylinder fits to said finishing point of said suction groove and there exists a third predetermined angle θ_3 between a front end point of said opening port of said second cylinder and said starting point of said discharge groove at a third position when said rotor rotates by said second predetermined angle from said second position; and
said front end point of said opening port of said second cylinder fits to said starting point of said discharge groove at a position when said rotor rotates by said third predetermined angle θ_3 from said third position.

4,927,339

ROTATING SCROLL APPARATUS WITH AXIALLY BIASED SCROLL MEMBERS

Delmar R. Riffe; Peter A. Kotlarek, both of La Crosse, and Robert E. Utter, Onalaska, all of Wis., assignors to American Standard Inc., New York, N.Y.

Filed Oct. 14, 1988, Ser. No. 260,153
Int. Cl.[5] F01C *1/04, 17/00, 19/00, 21/04*
U.S. Cl. 418—55 **170 Claims**



1. A fluid apparatus comprised of:
a first scroll member having an end plate, an upstanding involute portion disposed on said end plate, and a drive shaft on said end plate, said first scroll member further including two extension members at radially opposite ends

of said end plate extending generally parallel to said upstanding involute portion, said extension members having a drive key portion and a retainer portion;

a compression plate secured to said retainer portion of said extension members;

a second scroll member between said first scroll end plate and said compression plate, said second scroll member having an end plate, an upstanding involute portion disposed on said end plate for interleaving engagement with said upstanding involute portion of said first scroll member, two oppositely disposed idler drive keys, and an idler shaft on said end plate;

means for biasing said first scroll member end plate from said compression plate; and

means for driveably rotating said first scroll member shaft.

9. A fluid apparatus comprised of:

a hermetic shell including a high pressure portion;

a first scroll member disposed in said hermetic shell, said first scroll member having an end plate, an upstanding involute portion disposed in said end plate, and a shaft of diameter D on said end plate, said shaft having a plan view area defined by said diameter D, said plan view area exposed to high pressure in said high pressure portion of said hermetic shell for biasing said first scroll member;

a second scroll member disposed in said hermetic shell, said second scroll member having an end plate, an upstanding involute portion disposed on said end plate for interleaving engagement with said upstanding involute portion of said first scroll member, and a shaft of diameter I on said end plate, said shaft having a plan view area defined by said diameter I;

means for biasing said second scroll member end plate toward said first scroll member end plate;

means for driveably rotating said first scroll member shaft; and

means for rotatably supporting said second scroll member shaft.

4,927,340

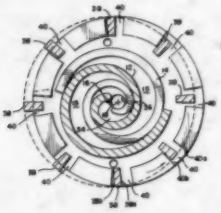
SYNCHRONIZING AND UNLOADING SYSTEM FOR SCROLL FLUID DEVICE

John E. McCullough, Carlisle, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Filed Aug. 19, 1988, Ser. No. 234,098

Int. Cl.[4] F01C *1/04*; F16D *3/04*

U.S. Cl. 418—55 **4 Claims**



1. A scroll fluid device comprising, in combination:

at least one pair of meshed axially extending involute spiral wraps having involute centers and defining at least one chamber between them that moves radially between an inlet zone and an outlet zone when one wrap is orbited by translation along a curvilinear path about an orbit center relative to the other wrap;

wrap support means secured to and supporting each wrap;

means for mounting said wrap support means for enabling relative orbital motion of the wraps relative to each other about an orbit radius;

synchronizer means arranged to prevent relative rotation of one wrap relative to the other notwithstanding the orbital motion of one wrap relative to the other, said synchronizer being arranged to permit motion of one wrap relative to the other in a direction extending generally along a line connecting the involute centers of the wraps;

said wrap support means arranged so that one wrap support means is movable relative to the other wrap support means in a direction generally along a line connecting the involute centers of the wraps, said one wrap support means being located normally such that the distance between involute centers corresponds with a selected orbit radius of the scroll fluid device;

said synchronizer means comprising axially extending teeth integral with and projecting from one wrap support means and axially extending grooves provided in the other wrap support means, said teeth and grooves being interdigited;

said teeth comprising radially and circumferentially extending elements having flat circumferentially spaced teeth side wall surfaces, said grooves defined by generally radially extending flat groove side wall surfaces;

each of said teeth side wall surfaces being separated by a tooth width and each of said groove side wall surfaces being separated by a groove width, and wherein said groove width corresponds to the maximum orbital excursion of the teeth side wall surfaces, said teeth and groove side wall surfaces cooperating to prevent relative rotation between the scroll support means while accommodating their relative orbital motion.

4,927,341

SCROLL MACHINE WITH RELIEVED FLANK SURFACE

James W. Bush, Sidney, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Continuation of Ser. No. 123,866, Nov. 23, 1987, abandoned. This application Apr. 12, 1989, Ser. No. 338,377

Int. Cl.[5] F01C *1/04*

U.S. Cl. 418—55 **30 Claims**

1. A scroll type machine including

first and second scroll members, each of said scroll members including an end plate having an outwardly projecting spiral wrap thereon, each of said wraps having active flank surfaces and radially inner tip end portions, and center and outer ports for receiving and discharging fluid, said wraps being interleaved with each other such that said active flank surfaces of said wraps interengage each other at a plurality of spaced locations so as to define a plurality of chambers therebetween such that when one of said scroll members is caused to orbit with respect to the other said scroll member said chambers will be caused to travel between said ports, whereby fluid received in one of said chambers through one of said ports if discharged through the other of said ports, the improvement comprising means defining a first relieved surface in the outer flank surface of one of said wraps, said relieved surface extending circumferentially inwardly along said flank surface from a point which is just circumferentially outwardly of the outer end of said flank surface on the other of said wraps which except for said relieved surface would

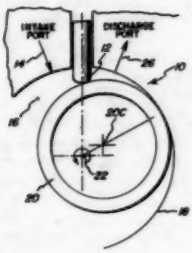
be an active flank surface and a ramp surface extending radially outwardly between the circumferentially inner end of said relieved surface and the adjacent active flank surface on said one wrap, said ramp surface extending circumferentially a distance substantially greater than the circumferential distance said relieved surface extends.

4,927,342

COMPRESSOR NOISE ATTENUATION USING BRANCH TYPE RESONATOR

Jeung T. Kim, and Imdad Imam, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 12, 1988, Ser. No. 282,784
Int. Cl.[5] F04C *18/356, 29/06*
U.S. Cl. 418—63 **20 Claims**



1. A rotary compressor comprising:
a compression chamber having a cylindrical housing:
a roller mounted for eccentric rotation within said cylindrical housing;
a discharge port communicating with said compression chamber; and
a resonator of the branch type, said resonator communicating with said compression chamber and being Helmholtz resonator having a bandwidth centered at within 20% of 4 kHz, and;
wherein said Helmholtz resonator has a cavity of volume V, and a passage having length 1 and cross-sectional area S_h and a passage extending to the cavity, and wherein the square root of V in $mm^{3/2}$ multiplied by $0.125/mm^3$ is within k percent of the square root of $S_h/1\ mm^4$, where k is not greater than 10%.

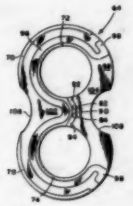
4,927,343

LUBRICATION OF GEAR PUMP TRUNNIONS

Kenneth F. Lonsberry, Hudson, Ohio, assignor to Permco, Inc., Streetsboro, Ohio

Continuation-in-part of Ser. No. 254,209, Oct. 6, 1988, abandoned. This application Aug. 3, 1989, Ser. No. 389,625
Int. Cl.[5] F03C *2/08;* **F04C** *2/18, 15/00*
U.S. Cl. 418—102 **12 Claims**

1. A thrust plate for a gear pump or the like comprising a plate member having two circular portions each with an aperture therethrough defining a figure-eight configuration, said plate member having a gear tooth confronting surface and a housing sealing surface each including a first pressure region and a second pressure region, said first pressure region being at a pressure different than the pressure at said second pressure region, said plate member also including a fluid transmitting path in each of said circular portions between said first pressure region on said gear tooth confronting surface and said second pressure region on said housing sealing surface, said



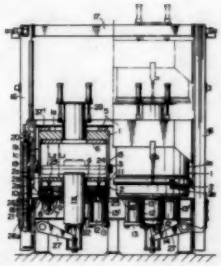
fluid transmitting path comprising a slot from each of said apertures in said circular portions of said plate member and a bore which passes through said slot and interconnects said housing sealing surface and said gear tooth confronting surface.

4,927,344

STEAM DOME TYPE VERTICAL TIRE PRESS

Itaru Amano, Kobe; Yasuhiko Fujieda; Katumi Ichikawa, both of Akashi, and Seisuke Fukumura, Miki, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Feb. 24, 1989, Ser. No. 315,266
Claims priority, application Japan, Feb. 29, 1988, 63-48142
Int. Cl.[5] B29C *35/04*
U.S. Cl. 425—28.1 **5 Claims**



1. A steam dome type vertical tire press comprising:
an upper dome having an upper mold mounting member for holding an upper mold;
a lower dome having a lower mold mounting member for holding a lower mold, said upper dome and said lower dome abutting at respective connection edges;
a dome lock ring engagable with said abutting connection edges of said upper and lower domes for locking said abutting connection edges;
a central mechanism vertically movably mounted at a central position of said lower mold mounting member;
a mold clamping cylinder having a pressure rod connected to said lower mold mounting member;
a cylinder support extending downwardly from said lower dome and connecting to said mold clamping cylinder for supporting said mold clamping cylinder;
a mold height adjusting device provided outside a dome space defined by said upper and lower domes and comprising means for adjusting a height between said upper and lower molds; and

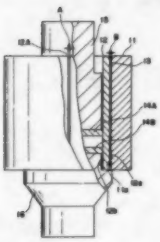
a heat/pressure medium sealing means interposed at least between an outer circumferential surface of said lower mold mounting member and an inner circumferential surface of said lower dome and between said connection edges of said upper and lower domes for sealing said abutting connection edges and for sealing a space between said lower mold mounting member and said lower dome, whereby said dome space is sealed.

4,927,345

PRESS CYLINDER FOR HIGH-TEMPERATURE, HIGH-PRESSURE PRESSING MACHINE

Makoto Takei, Nishinomiya, and Mamoru Tamura, Hirakata, both of Japan, assignors to Ohwada Carbon Industrial Co., Ltd., Osaka, Japan

Filed Feb. 27, 1989, Ser. No. 316,416
Claims priority, application Japan, Mar. 3, 1988, 63-50937
Int. Cl.[5] G01N *1/06;* A01N *1/00*
U.S. Cl. 424—4 **7 Claims**



1. A press cylinder for a high-temperature, high-pressure pressing machine, comprising:

an outer casing made of a carbon fiber reinforced carbon composite,

an inner casing made of a heat resistant material and formed with a longitudinally extending slit of a width (A) expressed by equation (I) which is fitted in the outer casing with a fitting gap (B) therebetween expressed by equation (II),

two press plates made of a heat resistant material and fitted in the inner casing, and

a press bar made of a heat resistant material and fitted in the inner casing, wherein

equation (I) is

$$A=\alpha\cdot T\cdot D\cdot\pi\cdot(C_2-C_1)$$

and equation (II) is

$$B=\beta\cdot T\cdot D\cdot(C_2-C_1)$$

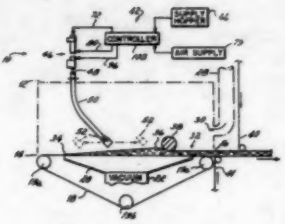
where A: slit width in mm, B: fitting gap in mm, α: 0.05~2.0, β: 0.1~2.0, T: temperature °C., D: outer diameter of the inner casing in mm, C_1: coefficient of linear expansion of the carbon fiber reinforced carbon composite of which the outer casing is made, and C_2: coefficient of linear expansion of the heat resistant material of the inner casing.

4,927,346

APPARATUS FOR DEPOSITING PARTICULATE MATERIAL INTO A PAD OF FIBROUS MATERIAL IN A FORMING CHAMBER

Thomas A. Kaiser, Vermilion; Douglas C. Mulder, Wellington, both of Ohio; David E. O'Ryan, Jackson, Mich.; Douglas A. Schneider, Lorain, and Rodney L. Ward, Wellington, both of Ohio, assignors to Nordson Corporation, Westlake, Ohio

Continuation of Ser. No. 939,093, Dec. 8, 1986, abandoned. This application May 2, 1989, Ser. No. 348,149
Int. Cl.[5] A29D *7/00*
U.S. Cl. 425—81.1 **26 Claims**



1. Apparatus for forming a non-woven pad of fibrous material with particulate material interspersed throughout a selected portion of the thickness of said non-woven pad, comprising:

a chamber having an inlet and an outlet;

a conveyor movable between said inlet and said outlet of said chamber;

means for introducing fibrous material into said chamber;

vacuum means located beneath said conveyor for applying a vacuum in said chamber to draw said fibrous material onto said conveyor, said fibrous material forming a non-woven pad on said conveyor which increases in thickness in a direction from said inlet of said chamber toward said outlet thereof, said non-woven pad having a bottom surface resting atop said conveyor and a top surface which slopes upwardly relative to said conveyor from said inlet of said chamber toward said outlet thereof;

dispenser means disposed within said chamber above said conveyor at a predetermined location along said upwardly sloping top surface of said non-woven pad for intermixing particulate material with a portion of said fibrous material being drawn onto said conveyor at said predetermined location to form a layer of intermixed fibrous material and particulate material within a predetermined portion of said thickness of said non-woven pad while maintaining another portion of said thickness of said non-woven pad substantially free of said particulate material.

4,927,347

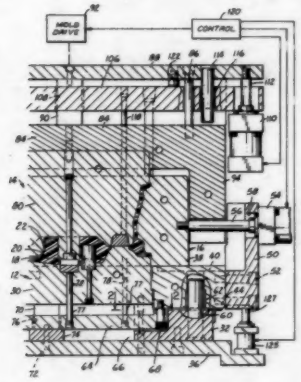
COMPRESSION MOLD FOR FIBER-REINFORCED COMPOSITE WHEELS

John H. Golata, and James A. Woelfel, both of Lansing, Mich., assignors to Motor Wheel Corporation, Lansing, Mich.

Filed Oct. 11, 1988, Ser. No. 255,445
Int. Cl.[5] B22C *9/28;* B29C *43/04*
U.S. Cl. 425—150 **3 Claims**

1. A compression mold for forming a fiber-reinforced composite wheel including integral rim and disc portions with a bead retaining flange on at least one axial end of said rim portion, said mold comprising: first radially reciprocable mold sections having mold surfaces defining radially outward rim-forming surfaces of a mold cavity, second and third axially opposed mold sections having mold surfaces defining disc-forming portions of said mold cavity and cooperable with opposing surfaces of said first mold sections for forming por-

tions of said rim including said flange, first means supporting said first mold sections for radial reciprocation relative to a central axis of said mold, second means mounting said second mold section in fixed position, third means mounting said third mold section for axial reciprocation between a first position adjacently opposed to said second mold section to form said mold cavity and a second position axially spaced from said second mold



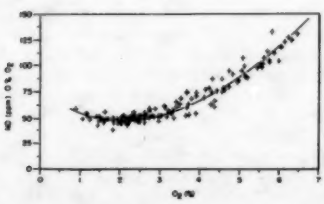
section in the direction of said third mold section, said fourth means including means resiliently urging said first means to said second position, and means for reciprocating said first and third mold sections between said first and second positions relative to said second mold section, said reciprocating means including fifth means for radially reciprocating said first mold sections on said first means, and sixth means for axially reciprocating said third mold section toward said second mold section, said third means including means for axial abutting engagement said first means and axially reciprocating said first mold sections toward said second mold section conjointly with said third mold section against said resiliently-urging means.

4,927,348

CIRCULATING FLUID BED COMBUSTION WITH CO COMBUSTION PROMOTER AND REDUCED COMBUSTION AIR

Amos A. Avidan, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,929
Int. Cl.[5] F23D 3/40
U.S. Cl. 431—7 **15 Claims**



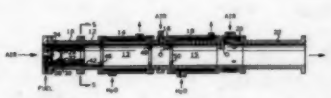
1. In a circulating fluidized bed combustion zone wherein a carbon-containing fuel is burned at an elevated temperature by contact with oxygen-containing gas added in an amount equal to at least 110% of the amount needed for complete combustion of the fuel, said combustion occurring in a generally vertical combustor comprising a fast fluidized bed of patriculated including limestone or dolomite wherein at least a majority of the particulate matter in the fast fluidized bed has a particle diameter in excess of 100 microns, to generate a flue gas/particulate stream which is discharged from the top of the combustor, said flue gas comprising excess oxygen, fines having a particle diameter less than about 100 microns, and circulating particles having average particle size of about 100–400 microns, which flue gas passes through a separation means to recover from the flue gas at least a majority of the 100–400 micron particles which are recycled to the circulating fluidized bed combustion zone, the improvement comprising burning said fuel in the presence of about 0.001 to 100 wt. ppm CO combustion promoter selected from the group of Pt, Pd, Rh, Ir, OS, and mixtures and compounds thereof in the combustion zone and reducing the amount of oxygen containing gas added per amount of fuel burned so that a total of 100 to 110% of the oxygen required for complete combustion of said fuel is added.

4,927,349

METHOD FOR BURNING NITROGEN-CONTAINING FUELS

Robert M. Schirmer; Ellsworth H. Fromm, and Henry E. Alquist, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 272,442, Jun. 10, 1981, Pat. No. 4,721,454, which is a continuation-in-part of Ser. No. 932,820, Aug. 10, 1978, abandoned, which is a continuation-in-part of Ser. No. 800,361, May 25, 1977, abandoned. This application Nov. 9, 1987, Ser. No. 118,827
Int. Cl.[5] F23M 3/04
U.S. Cl. 431—10 **13 Claims**



1. A plurality of combustion processes, each in an individual combustion zone having a primary combustion region and a secondary combustion region, comprising:

initiating a fuel-rich combustion stage, in said primary combustion region of each of said plurality of combustion zones, by burning a fuel-rich combustion mixture, comprising a fuel and a first volume of a preimary air source and having a fuel-air ratio greater than the stochiometric ratio, for a period of time sufficient to produce a moving primary combustion stage effluent comprising a flame front, unburned fuel and partially burned fuel;

abruptly terminating said fuel-rich combustion stage and initiating a fuel-lean combustion stage, in said secondary combustion region of each of said plurality of combustion zones, by reducing the peripheral dimension of said moving primary combustion region effluent and introducing into said moving primary combustion region effluent a second volume of a secondary air source to produce a fuel-lean combustion mixture having a fuel-air ratio less than the stochiometric ratio, said second volume of said secondary air being introduced at a longitudinally narrow zone immediately before said reduction of the peripheral dimension of said primary combustion region effluent; and

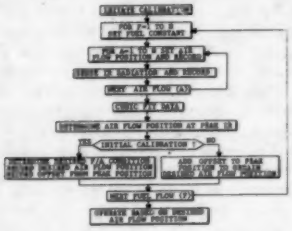
burning said fuel-lean combustion mixture, in said secondary combustion region of each of said plurality of combustion zones, to produce a moving secondary combustion stage effluent.

4,927,350

COMBUSTION CONTROL

Martin E. Zabielski, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 27, 1987, Ser. No. 43,571
Int. Cl.[5] F23N *1/00*
U.S. Cl. 431—12 **8 Claims**



1. In a combustion process which is regulated by maintaining a preselected feed forward relationship of fuel input and air input, the improved method of operating comprising:

establishing a fuel/air input peak relationship for the approximately stoichiometric condition which produces the maximum infrared radiation;

selecting a desired operating fuel/air ratio based on a result of the fuel/air input other than infrared radiation;

determining the desired fuel/air input relationship for said desired operating fuel/air ratio;

determining a fuel/air relationship offset between the fuel/air input peak relationship and the fuel/air input desired relationship;

operating the combustion process based on a feed forward signal representing the desired fuel/air input relationship;

recalibrating the process by later establishing a new fuel/air input relationship for the approximately stoichiometric condition which produces the maximum infrared radiation;

establishing a new desired fuel/air relationship by applying said fuel/air relationship offset to the new fuel/air input peak relationship;

operating the combustion process at the new desired fuel/air relationship.

4,927,351

METHOD AND SYSTEM FOR CONTROLLING THE SUPPLY OF FUEL AND AIR TO A FURNACE

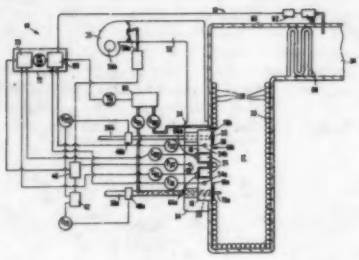
Donald K. Hagar, Emmaus, Pa., and Robert W. McIntyre, 2845 E. Overlook, Cleveland Heights, Ohio 44118, assignors to Eaglair, Inc., Bethlehem, Pa. and Robert W. McIntyre, Cleveland Heights, Ohio

Continuation of Ser. No. 917,900, Oct. 10, 1986, Pat. No. 4,887,958. This application Aug. 4, 1989, Ser. No. 393,150
Int. Cl.[5] F23N *5/00*
U.S. Cl. 431—12 **4 Claims**

1. A method for providing fuel and air to a furnace through a plurality of burner assemblies, each burner assembly including a combustion air register, each combustion air register including a combustion air passageway that produces a discrete air flow path of combustion air, an air valve for controlling the flow of combustion air through the burner assembly, and an air flow meter located exclusively in that combustion air register for measuring the air flow through the discrete air flow path downstream of the air valve, the method comprising the steps of:

(a) sensing a combustion characteristic produced by each separate burner assembly;

(b) sensing the air flow through each separate burner assembly by taking a separate measurement exclusively of the air flow through the discrete air flow path of each combustion air register downstream of the air valve, each such separate measurement being taken with the air flow meter for the combustion air register in which the measurement is being taken; and



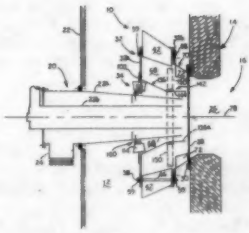
(c) separately controlling each individual air valve in response to the combustion characteristic sensed in step (a) and the air flows sensed in step (b) to thereby individually control the performance of each burner assembly.

4,927,352

BOILER FURNACE AIR REGISTER

Landy Chung, 5144 Cliff Dr., Ashtabula, Ohio 44004

Filed Jul. 19, 1988, Ser. No. 221,134
Int. Cl.[5] F23M *9/00*
U.S. Cl. 431—184 **21 Claims**



1. An air register for providing combustion air to a burner, comprising:

(a) an air register mounting frame comprising a pair of spaced apart support plates interconnected by circumferentially spaced, fixed housing members, said mounting frame defining an inlet opening for admitting combustion air between said fixed housing members;

(b) at least one, oblique non-planar, parallelogram-shaped, curved damper door pivotally mounted in said inlet opening for controlling the admission of combustion air into a region defined within said register,

(c) each of said damper doors including a pair of parallel edges which define an oblique angle with respect to an axis of said register; and

(d) pivot structure for pivotally mounting each of said damper doors, defining an axis of rotation for each door which extends substantially along a diagonal of said door.

4,927,353

CATALYTIC COMBUSTION DEVICE

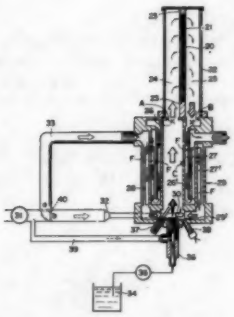
Yoshihiro Nomura, and Yoichiro Ohkubo, both of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Jun. 6, 1989, Ser. No. 362,094

Claims priority, application Japan, Jun. 6, 1988, 63-138878; Jun. 6, 1988, 63-138879

Int. Cl.[5] F23D *11/44*

U.S. Cl. 431—215 11 Claims



1. A catalytic combustion device having a fuel supply means communicated with a fuel supply source, an air supply passage communicated with an air supply source, a premixing chamber for mixing together fuel supplied from said fuel supply means and combustion air supplied from said air supply passage to form a fuel-air mixture, a catalyst installed in a combustion chamber to cause oxidation reaction of said fuel-air mixture supplied thereto, thereby effecting catalytic combustion said premixing chamber communicating with said combustion chamber, and an exhaust passage for discharging combustion gas from the catalyst in said combustion chamber, wherein the improvement comprises a part of said exhaust passage being defined outside said premixing chamber with a common wall being provided therebetween, said exhaust passage being communicated with said combustion chamber, and a part of said air supply passage defined being outside said exhaust passage with a common wall being provided therebetween, said air supply passage being communicated with said premixing chamber, thereby heating said premixing chamber by means of the combustion gas in said exhaust passage to vaporize the fuel and also heating said air supply passage to preheat the combustion air.

4,927,354

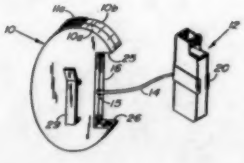
RETRACTABLE CIGARETTE LIGHTER HOLDER

Kirk Sanford, 18441 Vine St., Hesperia, Calif. 92345

Filed Jul. 5, 1988, Ser. No. 215,777

Int. Cl.[5] F23Q *2/32*

U.S. Cl. 431—253 13 Claims



1. A cigarette lighter holder assembly comprising:

a housing formed of two cup shaped portions in facing relation to define a hollow interior;

compartment means formed in the periphery of said housing, said compartment means including a back and opposing first and second edges generally transverse thereto, the dimensions of said edges and said back generally corresponding to the length and width of a lighter to be retained therein;

means, including spring means, in proximate relation to said compartment means for enabling releasable retention of a cigarette lighter within said compartment means in proximate relation to said back and between said edges; a retractable spring loaded reel mechanism mounted within said housing;

cord means having a first end thereof within said housing attached to said reel mechanism and a second end extending externally to said housing;

said second end of said cord means being attached to said spring means; and

said retractable reel mechanism includes cord retraining and release means for selectively retaining the amount of extension of said cord at selected points, the release of which allows said reel mechanism to retract the lighter.

4,927,355

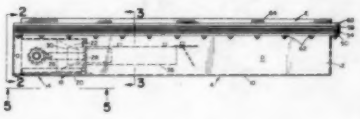
BURNER ASSEMBLY

Allen Haire, Garfield Heights, Ohio; Alan C. Abele, Zelienople, Pa., and Stanley W. Kuczek, Aurora, Ohio, assignors to Enerco Technical Products, Inc., Cleveland, Ohio

Filed Nov. 1, 1988, Ser. No. 265,559

Int. Cl.[5] F23D *14/14*

U.S. Cl. 431—329 14 Claims



1. A burner assembly comprising:

a housing having first and second surfaces spaced by a sidewall;

an air inlet defined on said first surface and adapted to communicate with a supply of gas;

means for mixing air and gas in said housing;

a plenum chamber defined in said housing operatively associated with said mixing means;

a radiant surface defined by a multi-ply screen assembly communicating with said plenum chamber and defining a combustion surface, said radiant surface being disposed on said housing at said second surface opposite said air inlet for eliminating backflashing;

means for compressing the multi-ply screen assembly wherein the compressing means has a coefficicnt of thermal expansion greater than said multi-ply screen assembly; and

a reverberator extending adjacent said radiant surface for reflecting heat from said radiant surface.

4,927,356

GAS BURNER

Tetsuji Otsuka, Neyagawa; Kenichi Shinozaki, Kashiwara; Kenji Toyoyama, Fujiidera, and Shinobu Ishihara, Kawachinagano, all of Japan, assignors to Osaka Gas Co., Ltd., Osaka, Japan

Filed Aug. 21, 1987, Ser. No. 88,124

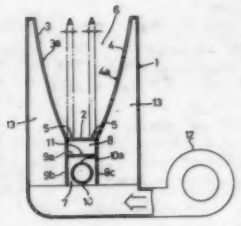
Claims priority, application Japan, Aug. 22, 1986, 61-197848; Dec. 27, 1986, 61-199926[U]; Dec. 27, 1986, 61-199927[U]; Apr. 2, 1987, 62-81967; Apr. 2, 1987, 62-81968; Apr. 3, 1987, 62-83578

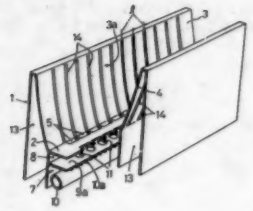
Int. Cl.[5] F23D *15/00*

U.S. Cl. 431—351 11 Claims

1. A gas burner, havng a base 2 containing a plurality of spaced flame openings 5 for discharging from an elongate mixing chamber 8 a mixture of gaseous fuel and primary com-

bustion air, said primary combustion air being supplied from an electric fan **12** directly to said mixing chamber **8**, said gaseous fuel being supplied to said mixing chamber from a gaseous fuel supply means **10** having a plurality of evenly spaced openings for supplying gaseous fuel uniformly over the length of the mixing chamber **8**, and a secondary air supply passage **13** for supplying secondary combustion air from said electric fan **12** into a combustion space **6** adjacent said flame openings **5**, comprising:





a pair of wall members **3**, **4**, extending from said base **2** on opposite sides of said flame openings **5**, defining therebetween said combustion space **6** extending in the discharge direction of said mixture; and

a plurality of secondary combustion air outlet openings **14** defined in said wall members **3**, **4** between adjacent flame openings **5** extending along the discharge direction of said mixture.

4,927,357

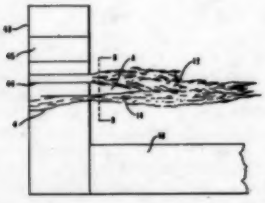
METHOD FOR GAS LANCING

Loo T. Yap, Princeton, N.J., assignor to The BOC Group, Inc., Murray Hill, New Providence, N.J.

Division of Ser. No. 310,161, Feb. 16, 1989, which is a continuation-in-part of Ser. No. 176,488, Apr. 1, 1988, abandoned. This application Oct. 12, 1989, Ser. No. 420,441

Int. Cl.[5] **F27B** *3/22*

U.S. Cl. 432—22 **5 Claims**



1. In a method of heating a surface comprising providing a burner system which produces a flame extending over said surface and providing one or more reaction-rate enhancing gas lances between the burner system and the surface, said lances producing a jet of said gas between the flame and the surface, the improvement comprising emitting said reaction rate enhancing gas such that the point of exit of the gas taken perpendicular to the longitudinal axis of the flow of the gas is essentially non-circular, thereby enhancing the uniformity of heating by producing a jet which creates an aerodynamically reduced pressure field thereby deforming the flame and displacing the flame toward the surface.

4,927,358

APPARATUS FOR PRODUCING HONEYCOMB PANELS

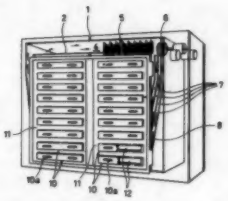
Mitsunobu Tamura, Chigasaki; Toshifumi Tsuchihashi, Tokyo, and Toshihisa Kenmochi, Wako, all of Japan, assignors to The Yokohama Rubber Co., Ltd. and Honda Giken Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 343,642

Claims priority, application Japan, May 6, 1988, 63-108949

Int. Cl.[5] **F26B** *3/04;* **B32B** *31/20;* **C09J** *5/06*

U.S. Cl. 432—204 **7 Claims**



1. Apparatus for producing honeycomb panels comprising:

a heating chamber isolated from external air by a wall; and

a plurality of drawout trays capable of being individually inserted into and withdrawn from the heating chamber through a plurality of openings formed in the wall; whereby each of the drawout trays has a work accommodating chamber connected to a vacuum source, a top opening of the work accommodating chamber being hermetically closed by a flexible sheet that can be opened and closed, and block plates at the front and rear ends for closing the opening in the wall at every terminal positions when inserted and withdrawn.

4,927,359

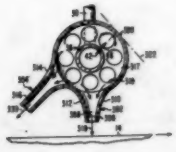
FLUID DISTRIBUTION APPARATUS

Thomas T. Hitch, Lawrenceville, N.J., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 3, 1989, Ser. No. 331,717

Int. Cl.[5] **F27B** *5/16, 5/10, 5/04*

U.S. Cl. 432—206 **13 Claims**



1. A fluid distribution apparatus for an atmosphere exhibiting temperature excursions, said apparatus comprising:

a first plenum adapted to receive pressurized fluid and having a plurality of spaced first orifices for distributing the received fluid in said plenum to a region exterior said plenum, the fluid in said plenum being at a first pressure and tending to flow through said orifices in jets;

a second plenum having a plurality of spaced second orifices, said second plenum being secured in fluid communication with said first plenum via said first orifices, the first and second orifices being dimensioned so that the fluid in the second plenum is at a second pressure lower than said first pressure, said plenums tending to expand and contract differently in response to said temperature excursions;

means for directing the jets against a surface in said second plenum to disperse the flow of said jets, said orifices and means for directing being so aligned and the pressure differential in the first and second plenums being sufficiently different so as to provide a substantially negligible pressure gradient of said fluid in said second plenum in a region along and adjacent to said second orifices;

securing means for securing said first plenum to said second plenum and for allowing said secured first and second plenums to move relative to one another in response to said different expansions and contractions of said plenums; and

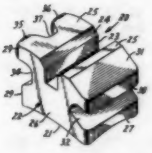
wherein said means for directing includes means for directing jets in a direction approximately towards said second orifices, said apparatus further including baffle means in the second plenum between said first and second orifices for dispersing the fluid in said jets.

4,927,360

TRIWING ORTHODONTIC BRACKET

Jirina V. Pospisil, Monrovia, Calif., assignor to Unitek Corporation, Monrovia, Calif.

Filed Apr. 29, 1988, Ser. No. 187,747
Int. Cl.[5] A61C *3/00*
U.S. Cl. 433—8 **4 Claims**



1. A labial triwing orthodontic bracket comprising a base, a body extending integrally from the base, said body having an outer labial face and having a mesiodistally extending arch-wire slot extending from the labial face toward the base, a pair of spaced-apart ligature tie wings extending gingivally away from the arch-wire slot, and a single tie wing extending occlusally from the arch-wire slot, the single occlusal tie wing having a mesiodistal width at least as large as the combined mesiodistal widths of the spaced-apart gingival tie wings, wherein the width of the occlusal tie wing substantially corresponds to the mesiodistal width of the bracket body and base.

4,927,361

ORTHODONTIC ATTACHMENTS

Dennis C. Smith, 183 St. Clair Ave. E, Toronto, Ontario, and Rolf Maijer, 435 Trunk Road, Suite 207, Duncan, British Columbia, both of Canada

Continuation of Ser. No. 402,307, Jul. 27, 1982, Pat. No. 4,460,336. This application Mar. 30, 1984, Ser. No. 595,321
Int. Cl.[5] A61C *7/00*
U.S. Cl. 433—9 **6 Claims**

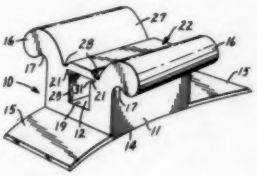
1. In a dental attachment for affixing by adhesive bonding to a tooth surface and having a tooth engaging surface suitable for effecting said adhesive bonding of said attachment to a tooth surface, the improvement which comprises particulate material on said tooth engaging surface.

4,927,362

CONVERTIBLE BUCCAL TUBE

Wilford A. Snead, San Dimas, Calif., assignor to Unitek Corporation, Monrovia, Calif.

Filed Jul. 12, 1988, Ser. No. 218,095
Int. Cl.[5] A61C *3/00*
U.S. Cl. 433—17 **12 Claims**



1. An integral, convertible buccal tube made of sintered metal for mounting on a molar tooth in an orthodontic treatment program, comprising:

a base configured for fitting on a tooth;

a body extending integrally from the base, and defining an elongated arch-wire slot; and

a cover plate extending across and closing a buccal side of the arch-wire slot, the plate being integrally joined to the body adjacent opposite sides of the slot by elongated, frangible webs extending along the length of the slot, the webs being of small cross section as compared to the cover plate buccal-lingual thickness, whereby the plate can be sheared from the body along both of the webs to open the slot.

4,927,363

DENTAL PROSTHESIS IMPLANT

Rudolf Schneider, Heidenreichstein, Austria, assignor to Netall- u. Kunststoffwaren Erzeugengsgesellschaft M.B.H., Vienna, Austria

Filed Jan. 4, 1989, Ser. No. 293,239
Claims priority, application Austria, Jan. 4, 1988, 4/88
Int. Cl.[5] A61C *8/00*
U.S. Cl. 433—173 **10 Claims**

1. An implant for affixing a dental prosthesis, comprising:

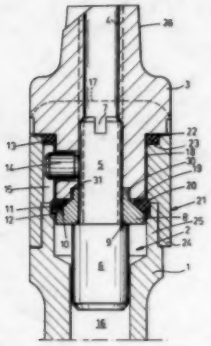
a primary member anchorable in a jawbone of a subject to be fitted with a dental prosthesis, said primary member having a recess opening at an end of said primary member and formed with an annular wall;

a secondary member detachably connectable to said primary member and formed with a throughgoing axial bore;

a screw in alignment with said bore and provided with a tool-engaging formation enabling rotation of said screw by a tool inserted into said bore;

a compression ring engaged by said screw and displaceable upon rotation of said screw axially toward a surface of said secondary member; and

an O-ring clamped between said compression ring and said surface, positioned in said recess and radially compressed against said wall between said surface and said compression ring upon rotation of said screw in one sense to resiliently retain said secondary member on said primary member, said O-ring releasing from said primary member upon rotation of said screw in a sense opposite said one sense to permit removal of said secondary member from said primary member, said compression ring being formed with a



frustoconical surface diverging in a direction opposite a direction of displacement of said compression ring by rotation of said screw in said one sense whereby said O-ring is pressed outwardly and said parts are drawn axially together upon rotation of said screw in said one sense, said secondary member being formed with a stop surface engaged by said compression ring upon rotation of said screw in said one sense to define a maximum compression of said O-ring.

4,927,364

STEERING WHEEL

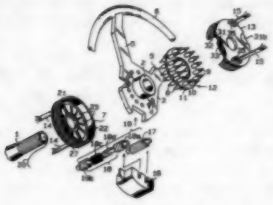
Shuji Inui; Tetsushi Hiramitsu; Toshinori Takahashi; Makoto Tamaki; Mitsuhiro Kikuta, and Junichi Mizutani, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Jun. 29, 1988, Ser. No. 213,294

Claims priority, application Japan, Jun. 30, 1987, 62-101568; Jul. 28, 1987, 62-189669

Int. Cl.[5] H01R *39/02, 39/08*

U.S. Cl. 439—15 **24 Claims**



2. A steering wheel comprising:

a pair of sun gears arranged facing each other, each sun gear comprising a wheel portion having an inner surface and a rim portion protruding along an outer circumference of said wheel portion,

at least two segmented slip rings mounted on said inner surface of said each wheel portion, said segmented slip ring being a plating formed on said inner surface of said wheel portion; and

contact pins, in sliding contact with said segmented slip rings on said each wheel portion, provided between said pair of sun gears.

4,927,365

APPARATUS FOR PROVIDING AN ELECTRICAL CONDUCTION PATH BETWEEN TWO CONTACT LOCATIONS WHICH ARE ROTATABLE WITH RESPECT TO EACH OTHER

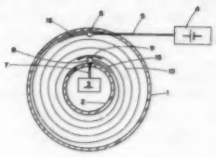
Friedrich Schauer, Heroldsberg, and Manfred Wolff, Schwarzenbruch, both of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany

Filed Nov. 2, 1989, Ser. No. 430,321

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1988, 3838114

Int. Cl.[5] H01R *39/00*

U.S. Cl. 439—15 **9 Claims**



1. In an apparatus for providing an electrical conduction path between a first contact location and a second contact location rotatable one with respect to the other, said electrical conduction path comprising a flat ribbon cable having at least two electrical conductors and being wound in the manner of a coiled spring, said flat ribbon cable being firmly attached at a first end thereof to said first contact location, and firmly attached at a second end thereof to said second contact location, the improvement comprising an end portion of said flat ribbon cable at said first end being folded across an immediately adjacent portion of said flat ribbon cable to form a change in the longitudinal direction of said flat ribbon cable, said folded portion of said flat ribbon cable having a stabilizer connection assembly positioned thereabout, said assembly including:

an angular attachment of molded insulating material, said attachment having a clamping segment and a ribbon-shaped, sheath segment extending at an angle one to the other, said clamping segment including a pair of clamping arms between which said folded end portion of said flat ribbon cable is positioned, and said sheath segment being positioned closely about a portion of the said flat ribbon cable immediately adjacent to said folded end portion;

a protective sheath of flexible insulating material positioned closely about a portion of said folded end portion of said flat ribbon cable, between said clamping arms; and

means for locking said clamping arms in a compressed condition.

4,927,366

FUSED ELECTRICAL CONNECTOR WITH SEWING WINGS

David P. Tommerson, and Kevin L. Brekkestran, both of Fargo, N. Dak., assignors to Environwear, Inc., Fargo, N. Dak.

Filed Sep. 8, 1989, Ser. No. 404,887

Int. Cl.[5] H01R *13/68, 13/58*

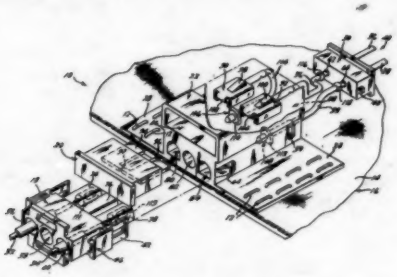
U.S. Cl. 439—37 **16 Claims**

12. An electrical connector assembly, adapted to be securely attached to fabric, for allowing electrical current to be supplied from a first wire conductor through the connector assem-

bly to a second wire conductor, the connector assembly comprising:

removable first connector means for securely receiving a portion of the first wire conductor;

second connector means for securely receiving a portion of the second wire conductor and removably connecting with the first connector means in a mating fashion, whereby mating connection of the first and second connector means operates to electrically connect the first and second wire conductors, thereby allowing current to flow through to the second wire conductor;



wing means of thin and substantially planar configuration securely attached to the second connector means and protruding outwardly therefrom for facilitating secure attachment of the second connector means to the fabric,

a readily removable and replaceable fuse adapted to reside in series with and between the first and second wire conductors; and

means, located in and forming part of one of the connector means, for removably receiving the fuse, whereby the fuse operates to interrupt the current flowing through the first and second wire conductors when more than a predetermined amount of current flows in the wire conductors.

4,927,367

SELECTIVE GROUNDING DEVICE FOR ELECTRONIC EQUIPMENT

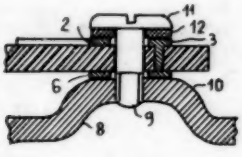
Elvio Salvagno, Caluso, Italy, assignor to Bull HN Information Systems Italia S.p.A., Caluso, Italy

Filed Mar. 7, 1989, Ser. No. 320,258

Claims priority, application Italy, Mar. 15, 1988, 19772 A/88

Int. Cl.[5] H01R *4/66*

U.S. Cl. 439—92 **2 Claims**



1. Selective grounding device for electronic equipment comprising at least a printed circuit board clamped to a ground frame by means of at least a screw inserted through an opening of the board and screwed into the ground frame, comprising a first conductive pad surrounding said opening and located on the board side contacting the frame, a second and third conductive pads, each insulated from the other, surrounding said opening on the other board side, the second of said pads being electrically connected to said first one, the third of said pads being electrically connected to the board's DC ground, and a washer, selectively insulating or conductive, overlaying said second and third pads and clamped against said second and third pads by said clamping screw.

4,927,368

CONNECTOR

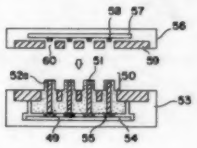
Katsuhide Shino, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 9, 1987, Ser. No. 107,765

Claims priority, application Japan, Oct. 13, 1986, 61-156200; Nov. 10, 1986, 61-172440; Nov. 19, 1986, 61-178675

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—66 **7 Claims**



1. A rubber connector having conducting portions and insulation portions disposed alternately with each other, said rubber connector comprising:

projecting portions formed on one side of said connector, each of said projecting portions being formed of a conducting portion extending to a front end face thereof and an insulating portion covering the peripheral face of said conducting portion, the conducting portion being exposed to the outside on the front end face of said projecting portion.

4,927,369

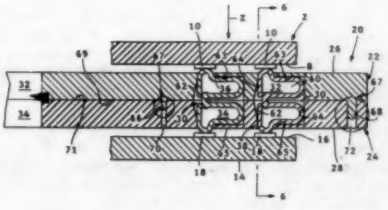
ELECTRICAL CONNECTOR FOR HIGH DENSITY USAGE

Dimitry G. Grabbe, Middletown, and William J. Schnoor, Upper Strasburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 22, 1989, Ser. No. 314,346

Int. Cl.[5] H01R *23/72*

U.S. Cl. 439—66 **9 Claims**



1. An electrical connector for interposition between first and second opposing surfaces each having thereon a multiplicity of contact pads arranged in a predetermined grid array, electrically to connect each pad on said first surface with a respective pad on said second surface, the connector comprising;

a pair of insulating plates arranged in parallel, superposed relationship, said plates presenting third and fourth opposed outer surfaces and each plate being formed with a multiplicity of recesses arranged in said predetermined grid array, each recess of one plate being aligned with a respective recess of the other plate to define a contact element receiving cavity;

connecting means formed integral with said plates and connecting said plates together in said superposed relationship

comprising first interengaging pins and sockets connecting outer margins of said plates, and second interengaging pins and sockets connecting said plates at positions between said cavities, the first pins and sockets being of substantially greater cross sectional area than the second pins and sockets; and

a multiplicity of contact elements each retained by said plates in a respective one of said cavities and each having a pair of opposed contact noses one of which protrudes through an opening in said third outer surface, for resilient engagement with a respective contact pad on said first opposing surface and the other of which protrudes through an opening in said fourth outer surface for resilient engagement with a respective contact pad on said second opposing surface.

4,927,370

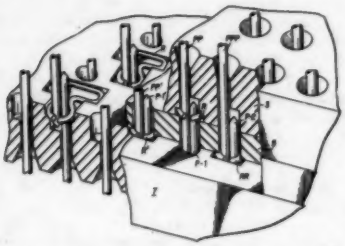
HIGH DENSITY CONNECTOR

Patrick J. Murphy, Mounds View, and John W. Svenkeson, Scandia, both of Minn., assignors to Unisys Corporation (Formerly Burroughs Corp), Detroit, Mich.

Continuation of Ser. No. 149,235, Jan. 27, 1988, abandoned. This application Jul. 28, 1989, Ser. No. 385,963

Int. Cl.[5] H01R *9/09, 13/20*

U.S. Cl. 439—74 **13 Claims**



1. Engager means for resiliently urging both of a pair of ohmic contact pins against one another, the engager means comprising a substantially C-shaped resilient conductive ring means including a spaced pair of ends and spring means therebetween, the ends opposing one another and spaced closer than the combined thickness of the pins;

said conductive ring means comprising a pair of resilient C-shaped segments adapted to surround a given pair of pins, plus a connective intermediate section formed as a substantially elliptical open loop and adapted to join said C-shaped segments and thrust said segments resiliently toward one another;

the pin pairs being arranged to be juxtaposed, or disposed relatively close together, with the open loop of the connector ring engaging said pin pairs, and also adapted to extend around one or more other adjacent pin pairs without touching said adjacent pin pairs.

4,927,371

SOCKET FOR SEMICONDUCTOR DEVICE

Hiroshi Nakatsu, Tenri, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 12, 1988, Ser. No. 242,980

Claims priority, application Japan, Sep. 14, 1987, 62-140657

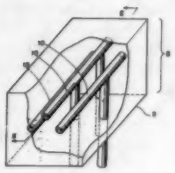
Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—79 **15 Claims**

1. A socket for a semiconductor device used for mounting a semiconductor device having a plurality of lead pins on a circuit board, comprising:

a socket body having a shape in the form of a generally solid rectangular block;

a plurality of receiving holes in said socket body, said receiving holes extending in mutually parallel relationship and having inner surfaces of conductive material for receiving each of said plurality of lead pins; and



a plurality of conductive coupling portions extending at right angles to and contacting said inner surfaces of said receiving holes for coupling said receiving holes to conductive portions of said circuit board.

4,927,372

ELECTRICAL CONNECTOR

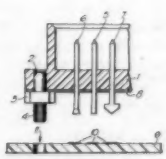
John C. Collier, Southport, United Kingdom, assignor to ITT Industries Limited, Basingstoke, United Kingdom

Filed Feb. 21, 1989, Ser. No. 312,831

Claims priority, application United Kingdom, Feb. 19, 1988, 8802893

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—83 **8 Claims**



1. A connector for a printed circuit board comprising a housing having a plurality of holes accommodating respective elongated contacts one end of which is adapted to make electrical contact with a conductive trace, pad or other conductive surface on the printed circuit board when the connector is brought into contact with the board, characterised in that the contacts (5,6,7) are capable of limited axial movement relative to the housing (1) in order to take up irregularities in the board and that frictional material (8) is provided to cause the contacts to be retained in the positions which they have taken up when the connector is fully engaged with the board (9).

4,927,373

ELECTRICAL SAFETY RECEPTACLE ASSEMBLY

Robert G. Dickie, Newmarket, Canada, assignor to Paige Manufacturing Company, Inc., Newmarket, Canada

Filed Oct. 26, 1989, Ser. No. 427,073

Int. Cl.[5] H01R *29/00*

U.S. Cl. 439—188 **9 Claims**

1. An electrical receptacle comprising

a receptacle housing,

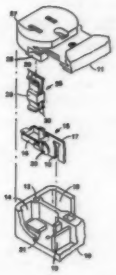
at least one pair of normally-open contacts disposed within said housing, and

means, responsive to the insertion of an electrical pin into said housing, for closing said normally-open contacts only

after said pin is inserted a substantial distance into said housing,

said means for closing said normally-open contacts comprising

fixed contacts,



bifurcated movable elements having contacts at the ends thereof,

said bifurcated movable elements being responsive to the insertion of said electrical pin therebetween to move said contacts into electrical connection with said fixed contacts.

4,927,374

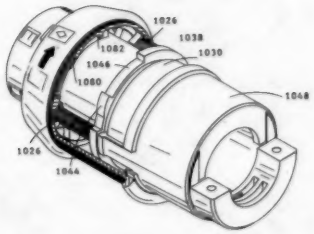
MODULAR ELECTRICAL CONNECTOR ASSEMBLY

Robert W. Pitts, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 940,835, Dec. 12, 1986, Pat. No. 4,820,204. This application Apr. 10, 1989, Ser. No. 335,603

Int. Cl.[5] H01R *13/62*

U.S. Cl. 439—310 **18 Claims**



1. An electrical connector assembly for interconnecting a plurality of conductors, the assembly comprising matable first and second connectors, each connector having a plurality of terminals located in insulative housing means, and latching means on the first and second connectors comprising a plurality of resilient collet fingers on the first connector and an outer shiftable sleeve surrounding an inner core on the second connector, the resilient collet fingers being deflectable over a surface on the inner core of the second connector when the outer shiftable sleeve is retracted, the sleeve being shiftable over the collet fingers to prevent disengagement of the collet fingers from the surface, the shiftable sleeve being spring biased relative to the inner core by at least one spring extending between first and second spring stops on the shiftable sleeve and the inner core respectively, the shiftable sleeve being initial rotatable relative to the inner core to confine at the least one spring between the spring stops, first anti-rotation means on the shiftable sleeve engaging second anti-rotation means on the inner core when the at least one spring is confined between the first and second spring stops.

4,927,375

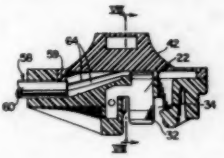
ELECTRICAL CONNECTOR FOR ELECTRICAL CONNECTION TO INSULATION DISPLACEMENT TERMINALS

George Debortoli, Ottawa, and Alex G. Cristescu, Montreal, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Feb. 23, 1989, Ser. No. 314,028

Int. Cl.[5] H01R *13/58, 13/627*

U.S. Cl. 439—357 **13 Claims**



1. An electrical connector for electrical connection to an insulation displacement terminal of a terminal assembly, the connector comprising:

a dielectric housing body having an integral latch means extending outwardly from one side of the body for releasably latching the connector in a mounting position on the terminal assembly, the housing body defining a chamber with an entrance to the chamber for an insulated conductor, a conductor terminal position within the body, an opening at another side of the body for access to the chamber and the terminal position, an electrical contact blade carried by and extending from said one side of the body, the contact blade also extending to the terminal position, and a conductor insulation strain relief means; and

a cover for positioning over and closing the opening, the cover locatable to close the opening in a snap-on manner.

4,927,376

ELECTRICAL PLUG ASSEMBLY AND SYSTEM

Robert G. Dickie, Newmarket, Canada, assignor to Paige Manufacturing Company Incorporated, New Market, Canada

Filed May 17, 1989, Ser. No. 353,092

Int. Cl.[5] H01R *19/04*

U.S. Cl. 439—484 **7 Claims**

1. An alternating current low profile electrical plug assembly comprising

a flat, low profile insulative plug body having a vertical axis,

a plurality of conductive pins having a connector portion extending perpendicularly to said plug body for engagement with mating sockets in an electrical outlet,

each of said pins including at least one stabilizing land area at right angles to said connector portion and embedded in said body,

each of said pins including a wire connecting area also at

right angles to said connector portion and embedded in said body,

electrical wires connected to said pins and exiting said body at an acute angle to said vertical axis and

a cone-shaped sleeve attached to said body and enclosing said electrical wires, said sleeve including a bend which realigns said electrical wires with said vertical axis.

4,927,377

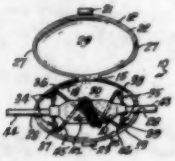
PROTECTOR FOR JOINED EXTENSION CORDS

William D. Bach, 5715 Ventura Canyon Ave., Van Nuys, Calif. 91401, and Donald R. Murphy, 3861 Poppyseed La., Apt. #1, Calabasas, Calif. 91302

Filed Dec. 12, 1988, Ser. No. 282,624

Int. Cl.[5] H01R 13/62

U.S. Cl. 439—367 11 Claims



1. In a protector for joined plugs on the ends of cords, said protector comprising a pair of shells each of which having a wall and interior surface thereon and closable upon one another to form a cavity while providing distal ports which produce apertures in its closed mode, the joined plugs adapted to be disposed within such cavity in the protector's open mode, the improvement comprising

means for attaching to the protector stretchable bands adapted to be twisted and entwined about such plugs to keep them joined together, said attaching means being mounted to the interior surface of the wall of one of the shells.

4,927,378

LEAD WIRE CONNECTING DEVICE FOR COAXIAL CABLE CONNECTOR

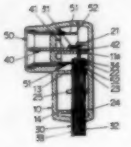
Jae C. Song, 295-9, Jangan-1 Dong, Dongdaemoon-Ku, Seoul, Rep. of Korea

Filed Dec. 27, 1988, Ser. No. 290,460

Claims priority, application Rep. of Korea, Dec. 23, 1987, 22863/1987

Int. Cl.[5] H01R 4/24

U.S. Cl. 439—394 11 Claims



1. A connector for electrically connecting a coaxial cable to an appliance, said connector comprising:

a conductive pin for electrically connecting an exposed end of a core wire of the coaxial cable to the appliance, said pin having an inner end for contacting the exposed end of the core wire;

a conductive sleeve for electrically connecting a shield wire of the coaxial cable to the appliance, said sleeve surrounding said pin, said sleeve having a conductive spike for piercing through an outer layer of insulation to contact the shield wire of the coaxial cable; and

a pinching piece for cooperating with said inner end of said pin to bend the exposed end of the core wire between said pinching piece and said inner end of said pin.

4,927,379

ELECTRICAL CONNECTOR

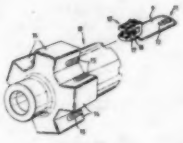
Patrick S. Wang; Georg Strobl, and Raymond W. H. Chu, all of Hong Kong, Hong Kong, assignors to Johnson Electric Industrial Manufactory, Limited, Chaiwan, Hong Kong

Filed Aug. 19, 1988, Ser. No. 233,756

Claims priority, application United Kingdom, Aug. 20, 1987, 8719715; Oct. 1, 1987, 8723021

Int. Cl.[5] H01R 4/24

U.S. Cl. 439—398 11 Claims



1. An electrical connector formed from sheet material folded to provide two overlying parts, each part having a slot open at one end, the open ends of the slots being adjacent and the two slots being arranged so as to be only partly in register with one another so that the resultant slot in the connector is narrower than each of the slots in the two overlying parts and is open at one end for receiving and gripping a wire, non-aligned regions (as considered in a direction perpendicular to the plane of each overlying part) bordering the slots of the two overlying parts, the non-aligned regions defining the resultant slot being offset by a part-shearing out of the plane of the respective part towards the other part so that the non-aligned regions are substantially co-planar.

4,927,380

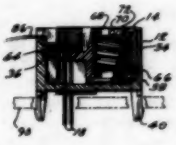
PRINTED CIRCUIT BOARD CONNECTOR

Howard Reynolds, Waterbury, Conn., assignor to The Siemon Company, Watertown, Conn.

Filed Dec. 23, 1988, Ser. No. 289,546

Int. Cl.[5] H01R 4/24

U.S. Cl. 439—411 19 Claims



1. An electrical connector comprising:

insulative housing means, said housing means having an opening leading to a housing means cavity, said cavity having a predetermined shape;

insulative insert cover means having a predetermined shape which corresponds to said predetermined shape of said cavity, said insert cover means being received in said cavity of said housing means;

threaded screw means threadably received in said insert cover means, said screw means being captured and, re-

tained by screw means retaining means in said housing means; and

at least one conductive terminal supported in said housing means and extending into said insert cover means wherein said insert cover means is raised or lowered in said housing means by actuation of said threaded screw means and wherein a wire lead will be simultaneously terminated on said conductive terminal when said insert cover means is lowered.

4,927,381

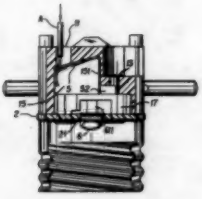
ELECTRICAL PUSH-PULL CONNECTOR

Jean Y. Shang, 1, Lane 118, San Ho Rd., Fong Ywan City, Taichong County, Taiwan

Filed Jul. 26, 1989, Ser. No. 385,089

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—438 **6 Claims**



1. An electrical push-pull connector, comprising:

a housing, having a pair of slots formed through a top surface thereof for insertion of a pair of electrical leads;

an insulation disc secured to said housing;

a screwshell member secured to said housing, said screwshell and said insulation disc being rivetted to said housing, said screwshell being substantially tubular in contour having internal threads for threaded coupling to a lamp base;

displaceable actuation means for electrically actuating said connector, said displaceable actuation means including a longitudinally extending and displaceable push-pull stem member extending through said housing, said push-pull stem member having coupled thereto an electrically conductive sliding brass member displaceable within a central slot formed in said housing, and a coil spring contacting said stem member for biasing said stem member in a predetermined direction;

a pair of bent spring members locationally positioned on opposing sides of said central slot for displaceable contact with said sliding brass member;

an insulation member mounted on said insulation disc; and,

a C-contoured spring positioned within a recess of said housing for contacting one of said bent spring members.

4,927,382

ELECTRICAL FUNCTION GROUP FOR A VEHICLE

Anton Huber, Regensburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

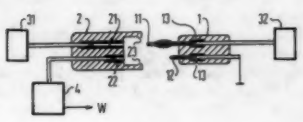
Filed Sep. 21, 1988, Ser. No. 249,763

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1987, 3737289

Int. Cl.[5] H01R *3/00*

U.S. Cl. 439—490 **4 Claims**

1. An electrical function group for a vehicle comprising a useful circuit that contains at least two electrical module units that are connected via a plurality of electrical plug-type connectors each comprising a plug part and a socket part whereby said plug part has at least one useful contact comprising a longer contact pin and at least one signal contact comprising a shorter contact pin, and said socket part has at least two contact sleeves for frictional acceptance of said contact pins, and further comprising a signal circuit being conducted serially through said plurality of electrical plug-type connectors



that contains a monitoring means being conducted via the signal contact, said monitoring means generating an alarm given an interruption of said signal circuit due to a parting of the signal contact in any one of said plug-type connectors.

4,927,383

ELECTRICAL PLUG CONNECTOR

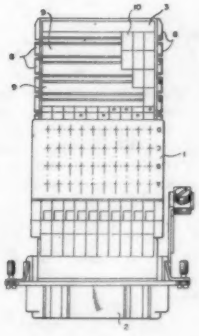
Willi Dirkop, Reinheim, and Wolfgang Scheffner, Roedermark-deutsche Staatsbürger, both of Fed. Rep. of Germany, assignors to C. A. Weidmüller GmbH & Co., Fed. Rep. of Germany

Filed Jul. 18, 1989, Ser. No. 381,381

Claims priority, application European Pat. Off., Aug. 4, 1988, 88112662.7

Int. Cl.[5] H01R *3/00*

U.S. Cl. 439—491 **6 Claims**



1. An electrical plug connector, comprising

(a) a housing; and

(b) a plate slidably connected with said housing for movement between a retracted position wherein said plate is arranged within said housing and an extended position wherein said plate is arranged beyond said housing, said plate including a label for designating the poles of the connector, said label being visible when said plate is in the extended position and said label and said plate being obscured from view by said housing when said plate is in the retracted position.

4,927,384

FLAT WIRE TO ROUND WIRE ELECTRICAL INTERCONNECT

Reginald A. Bates, Kernersville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

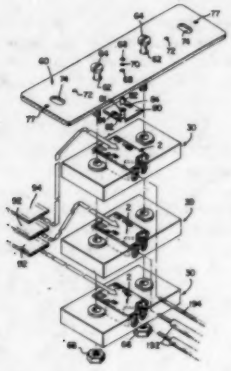
Continuation of Ser. No. 898,969, Aug. 21, 1986, abandoned. This application Apr. 17, 1989, Ser. No. 339,900

Int. Cl.[5] H01R *9/07*

U.S. Cl. 439—494 **26 Claims**

1. A transition block for interconnecting flat undercarpet power cable having a plurality of flat conductors arranged side-by-side in the same plane to round conductor power cable,

the transition block comprising means for arranging at least some of the flat conductors into an array of planes separate from one another to decrease the width of the cable at the arranging means, at least one of said planes in said array being distinct from the plane of said flat cable, each arranging means including means for electrically interconnecting a flat power cable conductor to a round conductor, the arranging means comprising individual block members which carry individual electrical interconnection means, the block members being stackable one above the other and for trapping between them



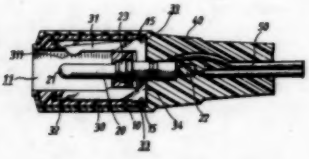
a flat power cable conductor, the transition block further comprising means to urge the block members together, effecting the electrical connection between the conductors and the individual electrical interconnection means, means to secure the block within an electrical utility box comprising a mounting yoke which is connectable to the transition block, the mounting yoke having mounting holes in alignment with threaded holes on the utility box, and the transition block further comprising means to common conduit carrying the round cable into the utility box to flat shielding which overlies the flat power cable and to a ground conductor.

4,927,385

CONNECTOR JACK

Yu F. Cheng, No. 7, Fu Hsing St., Tu Cheng Ind. Dist., Taipei Hsien, Taiwan

Filed Jul. 17, 1989, Ser. No. 380,314
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—578 **3 Claims**



1. A connector jack comprising:

a molded retainer (10) having a cylindrical body including a central recess (11) at a front end thereof for receiving an annular prong of a plug, two slots (12) at a rear end thereof, a central stepped recess (13) at the rear end thereof, and a perforation (14) formed on a base of said stepped recess (13);

a conducting pin (20) centrally located within said molded retainer (10), said conducting pin (20) including a pin body (21), two conducting arms (22) formed in parallel with said pin body (21), and a pin-neck (23) which connects the two conducting arms (22) to said pin body (21), said pin-neck (23) having a stepped profile, said conducting pin (20) being insertable into said central stepped recess (13) with said pin body (21) passing through said perforation (14) and being retained in said central recess (11), said pin-neck (23) being retained in said stepped recess (33); and

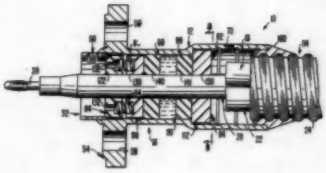
a resilient clamping element (30) including a conducting leg (31) and a fixing leg (32) and a T-shaped stem (34) which connects said conducting leg (31) and said fixing leg (32), said conducting leg (31) and said fixing leg (32) being respectively insertable into said slots (12) of said molded retainer (10), said conducting leg (31) further including a semicircular-shaped conducting end (311) at an inner side thereof, said semicircular-shaped conducting end (311) projecting over said slot (12) into said central recess (11).

4,927,386

ELECTRICAL CABLE CONNECTOR FOR USE IN OIL WELLS

David H. Neuroth, Hamden, Conn., assignor to Hubbell Incorporated, Orange, Conn.

Filed Aug. 22, 1988, Ser. No. 234,574
Int. Cl.[5] H01R *13/40*
U.S. Cl. 439—589 **14 Claims**



1. An electrical cable connector, the combination comprising:

at least one continuous insulated electrical conductor having a connecting end;

a hollow housing receiving a portion of said electrical conductor therein and having first and second open ends with said electrical conductor being rigidly coupled to said housing adjacent said first open end and said connecting end of said electrical conductor extending outwardly from said second open end of said housing;

means, located in said housing, for sealing the space between said housing and said conductor,

said means comprising

a first sealing assembly coupled to said housing in a relatively stationary position and having a portion of said conductor extending therethrough,

a second sealing assembly slidably coupled to said housing and axially spaced from said first sealing assembly and having a portion of said conductor extending therethrough,

a dielectric, incompressible, flowable sealing material located in said housing between said first and second sealing assemblies, and

biasing means, coupled to said housing, for biasing said second sealing assembly towards said first sealing assembly for pressuring said sealing material to fill any otherwise empty spaces between said housing and said first and second sealing

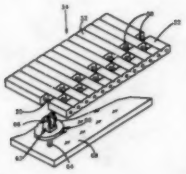
assemblies and between said conductor and said first and second sealing assemblies under the influence of said biasing means.

4,927,387

METHOD AND DEVICE FOR CONNECTION TO WIRES IN A FLEXIBLE CABLE

Donald F. Eckler, Newark Valley; John R. Mankus, Endicott; Francis J. Ripp, Vestal, and George J. Saxenmeyer Jr., Apalachin, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 15, 1988, Ser. No. 284,577
Int. Cl.[5] H01R 9/07
U.S. Cl. 439—499 15 Claims



1. A method of connecting the wires in a flexible cable wherein the wires are laterally spaced within an insulating coating to a connector device having a plurality of connectors each having a bifurcated end portion adapted to transversely engage the wires for electrical contact comprising the steps of:

arranging said connectors in said device in a preselected pattern disposed to receive the wires therein;

stripping the insulation completely from selected portions of each of said wires in said cable in a pattern which corresponds to the pattern of arrangement of said connectors while maintaining the stripped portions of the wires essentially co-planer and axially parallel; and

thereafter forcing said stripped wire portions transversely into engagement with said connectors with the wires remaining essentially co-planer and parallel;

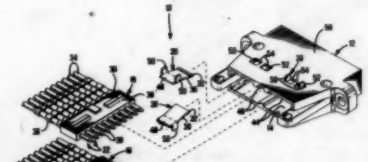
whereby connection of pre-exposed bare wires is made to connections in a preselected pattern in a sliding manner.

4,927,388

ELECTRICAL CONNECTOR SHELL ASSEMBLY AND MODULE RETENTION CLIP

David H. Gutter, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 29, 1989, Ser. No. 414,814
Int. Cl.[5] H01R 13/62
U.S. Cl. 439—660 3 Claims



1. A retention clip for being affixed along an inside surface of a connector shell for retention of a terminal module therein, the clip being of the type having a mounting section and a module-engaging spring arm extending forwardly therefrom to a free end adapted to latch behind a transverse rib of the terminal module to prevent rearward axial movement of the module after insertion into the shell, the improvement comprising:

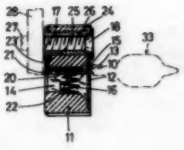
said mounting section comprising a body section having a pair of initially outwardly extending tabs along lateral edges of the body section, said tabs adapted to be inserted outwardly through associated longitudinal slits in the cavity-defining wall of the shell and then be bent over along the outwardly facing surface of the shell, securing the clip to the shell with the body section against the inwardly facing surface of the shell and the spring arm extending forwardly therefrom and inwardly into the shell cavity.

4,927,389

FIXTURE FOR MULTIPLE-CONTACT PIN HALOGEN LAMPS

Helmut Willnat, and Manfred Meichsner, both of Kierspe, Fed. Rep. of Germany, assignors to Bender & Wirth GmbH & Co., Kierspe, Fed. Rep. of Germany

Filed Jan. 18, 1989, Ser. No. 298,594
Claims priority, application Fed. Rep. of Germany, Jan. 19, 1988, 8800561[U]
Int. Cl.[5] H01R 13/00
U.S. Cl. 439—682 23 Claims



1. A fixture for current consuming devices, particularly for halogen lamps with plural contact pins, comprising a socket having recesses for contact pins; an electrical connector for each of said recesses, at least one of said connectors comprising a contact element provided in one of said recesses and engageable by a contact pin, a conductive fastener element provided in said socket, and an intermediate member integral with at least one of said elements and providing an electrical connection between said elements; support means including electrical conductors for said connectors; and means for connecting said fastener element to said support means so that the fastener element electrically connects said contact element with the respective conductor in response to connection of said fastener element to said support means.

4,927,390

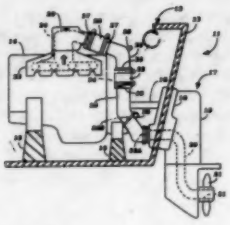
GAS EXHAUSTION DEVICE FOR INBOARD/OUTBOARD ENGINE

Noboru Kudoh; Itsushi Hirukawa; Satoshi Aoki; Tsuyoshi Yoshimura, and Shigeki Shiozawa, all of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamtsu, Japan

Filed Dec. 22, 1988, Ser. No. 289,982
Claims priority, application Japan, Dec. 25, 1987, 62-327310
Int. Cl.[5] B63H 21/32, 21/38
U.S. Cl. 440—88 13 Claims

1. In a fluid connection between a rigid conduit, a flexible conduit adapted to be telescopically received with said rigid conduit and releasable clamping means for retaining said con-

duits together, the improvement comprising a projection on said rigid conduit position and provided for the sole purpose of



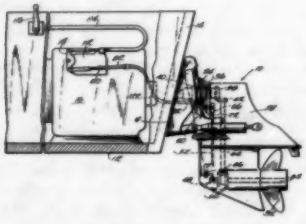
engaging said clamping means when said clamping means is released for retaining said clamping means.

4,927,391

SHIFT MEANS FOR MARINE PROPULSION DEVICE

Gerald F. Bland, Glenview, and Donald K. Sullivan, Waukegan, both of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Dec. 3, 1984, Ser. No. 677,569
Int. Cl.[5] B63H 5/13
U.S. Cl. 440—84 28 Claims



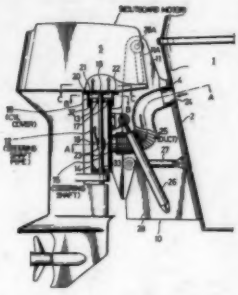
1. A marine propulsion device comprising a pivot housing adapted to be mounted on a boat transom for pivotal movement relative to the boat transom about a generally vertical steering axis, and for pivotal movement relative to the boat transom about a generally horizontal tilt axis, a propulsion unit including a reversible transmission and being removably connected to said pivot housing for pivotal movement with said pivot housing, and means extending between said pivot housing and said propulsion unit for actuating said transmission from forwardly of said pivot housing and including a vertically shiftable member located in said propulsion unit and operably connected to said transmission for actuation thereof, a push-pull cable extending forwardly from said housing for actuation at a remote point, and means for automatically coupling said push-pull cable to said vertically shiftable member incident to connection of said propulsion unit to said pivot housing and for automatically uncoupling said push-pull cable and said vertically shiftable member incident to disconnection of said propulsion unit from said pivot housing.

4,927,392

AIR SUPPLY APPARATUS FOR OUTBOARD MOTOR

Nobuo Makihara, and Hideo Tahara, both of Yokosuka, Japan, assignors to Nissan Motor Co., Ltd., Kanagawa, Japan

Filed Mar. 13, 1989, Ser. No. 322,199
Claims priority, application Japan, Mar. 15, 1988, 63-33817[U]
Int. Cl.[5] B63H 21/36
U.S. Cl. 440—88 9 Claims



1. An air supply apparatus for an outboard motor provided with an engine compartment and a steering shaft and movably support near a transom of a boat hull, which comprises:

(a) a hollow steering shaft pipe positioned below said engine compartment and supported near the transom, formed with an inner hollow portion communicatable with the engine compartment; and

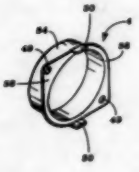
(b) a flexible duct, connected between said hollow steering shaft pipe and the transom, for introducing air from inside the hull to the engine compartment through said flexible duct and said hollow steering shaft pipe.

4,927,393

FIXING STRUCTURE FOR BELLOWS OF MARINE PROPULSION DEVICE

Kenichi Hayasaka, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

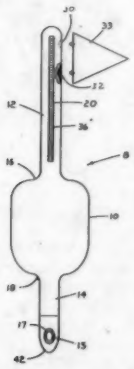
Filed Nov. 25, 1988, Ser. No. 276,063
Claims priority, application Japan, Nov. 26, 1987, 62-298808
Int. Cl.[5] F16J 3/04
U.S. Cl. 440—112 5 Claims



1. A marine propulsion device comprising an engine output shaft leading through a transom mount, a universal joint coupling said engine output shaft with an input shaft of a drive unit for directing engine output to a propulsion means of said drive unit, a swivel casing having a cylindrical opening to accommodate a portion of said universal joint, said swivel casing affording tilting movement of said drive unit relative to said transom mount, and a flexible bellows extending over said universal joint, wherein said bellows includes a cylindrical end disposed within said cylindrical opening in swivel casing and a retaining sleeve having a sleeve portion engaging the inner surface of

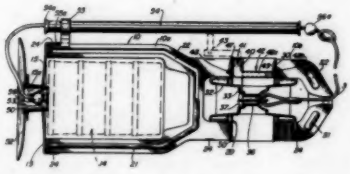
said bellow: cylindrical end to form a seal between said retaining sleeve and said cylindrical opening in swivel casing, said retaining sleeve further comprising a flange portion for directly affixing said retaining sleeve to said swivel casing.

4,927,394
UNITARY BUOY
Thomas Galgana, 22 Gannett Rd., Quincy, Mass. 02169
Filed Oct. 24, 1988, Ser. No. 261,689
Int. Cl.[5] B63B *21/00*
U.S. Cl. 441—1 **1 Claim**



1. A unitary buoy, comprising a body portion and a handle portion, the body portion including a first end, the handle portion extending from the first end and including a terminal end and a shaft and having a series of longitudinal teeth set in a channel, the shaft being hollow.

4,927,395
COMBINED BUOY AND ANCHOR DEVICE
Kenneth D. Saulnier, P.O. Box 815, Yarmouth, Nova Scotia, Canada (B5A 4K4), and Hubert J. Van Leeuwen, Amherst, Canada, assignors to Kenneth D. Saulnier, Yarmouth, Canada
Filed Jun. 9, 1989, Ser. No. 363,938
Int. Cl.[5] B63B *22/24*
U.S. Cl. 441—26 **7 Claims**

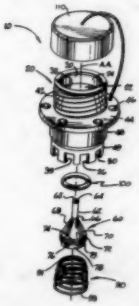


1. A combined buoy and anchor device for fishermen, comprising:
(a) a buoy body with a hollow interior, and having a closure member for closing its upper end,
(b) a reel rotatably mounted in the buoy body and to which is secured the inner end of a cable,
(c) an anchor connected to an outer end of said cable,
said anchor including a shank and a plate detachable from said shank, and wherein said plate and said closure member have interengaging means whereby said plate can be retained in place on said closure member.

4,927,396
SONOBUOY
Gordon H. Wood, London, Canada, assignor to Her Majesty the Queen in Right of Canada as represented by the Minister of National Defence, Canada
Filed Jan. 19, 1989, Ser. No. 299,059
Claims priority, application Canada, May 26, 1988, 567752
Int. Cl.[5] F41F *5/02*
U.S. Cl. 441—33 **6 Claims**

1. A sonobuoy comprising:
a container adapted to rest side-by-side and end-to-end with plural containers of the same configuration;
an inflatable parafloat collapsed into an upper chamber of the container;
compressed gas means in the container for inflating the parafloat;
a hydrophone;
a hydrophone suspending cable assembly; and
release means for normally securing the hydrophone and the suspending cable assembly to the container and operable to release the hydrophone and suspending cable in response to deposition of the container in a body of water.

4,927,397
RAFT INFLATION VALVE
Gregory H. Yeager, 309 Jackson, Denver, Colo. 80206
Filed Feb. 23, 1989, Ser. No. 314,823
Int. Cl.[5] B63B *35/58*
U.S. Cl. 441—41 **6 Claims**



1. A raft inflation valve assembly comprising:
(a) a tubular body member adapted to be mounted in fixed relationship with a raft bladder and having a central bore defined by an interior surface having an upper opening exterior of said raft bladder and a lower opening interior of said raft bladder; said tubular body member comprising a first annular lip surface defining a portion of said central bore and a second annular lip surface defining a portion of said central bore;
(b) a plunger member for coacting with said valve body member, for alternately placing said inflation valve assem-

bly in an open state and a closed state; said plunger member being received in said tubular body member bore and having a shaft portion having a first end which is adapted to engage said first lip portion for maintaining said inflation valve assembly in said open state and having a base portion which is adapted to engage said second lip portion for placing said inflation valve assembly in said closed state; and

(c) biasing means for biasing said plunger member upwardly within said valve body bore.

4,927,398

INCANDESCENT LAMPS INCLUDING A COMBINED GETTER

John W. Shaffer, Montoursville, Pa., assignor to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 287,769, Dec. 21, 1988, abandoned, which is a continuation-in-part of Ser. No. 287,574, Dec. 16, 1988, which is a continuation of Ser. No. 153,863, Feb. 9, 1988, abandoned. This application Sep. 19, 1989, Ser. No. 409,979

Int. Cl.[5] H01J *9/38*

U.S. Cl. 445—9 **23 Claims**

9. A method of gettering an incandescent lamp comprising the steps of:

introducing a phosphorus source into an unsealed envelope;

treating the phosphorus source contained in the unsealed envelope to produce elemental phosphorus within the unsealed envelope;

introducing a fill gas and silane into the unsealed lamp envelope;

sealing the lamp envelope; and

activating the elemental phosphorus and silane contained in the sealed envelope.

4,927,399

DIAPHRAGM GAME CALL WITH TONE MODIFYING SLITS

Mark Mueller, Pacific, Mo., assignor to Penn's Woods Products, Inc., Delmont, Pa.

Filed Jan. 24, 1989, Ser. No. 300,856

Int. Cl.[5] A63H *5/00*

U.S. Cl. 446—207 **20 Claims**

1. A game caller of a size and shape suitable for insertion into a user's mouth for support against the roof of the mouth comprising:

a support;

first and second generally flat diaphragms fixidly retained by the support in a generally spaced-apart relationship with respect to one another with one of the diaphragms generally overlying the other, each diaphragm presenting an edge free of the support to vibrate by exhausted pulmonary air, the first diaphragm having at least two slits to provide a flap on the first diaphragm and the second diaphragm having at least one slit to permit exhausted pulmonary air to flow therethrough, the exhausted pulmonary air causing said flap to flutter during use.

4,927,400

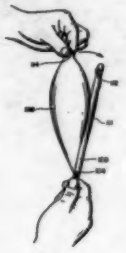
BALLOON SCULPTURING METHODS, APPARATUS AND PRODUCTS

Craig J. Lovik, 8565 Custer School Rd., Custer, Wash. 98240

Division of Ser. No. 183,720, Apr. 19, 1988, Pat. No. 4,850,926. This application Jun. 21, 1989, Ser. No. 370,636

Int. Cl.[5] A63H *3/06*; A45B *19/00*

U.S. Cl. 446—220 **20 Claims**



1. The method of forming a sculpture from one (1) or more balloons comprising the steps of:

(a) establishing a balloon forming device consisting of rigid rod-like balloon former defining means; and,

(b) securing at least one (1) balloon to the rigid rod-like balloon former defining means in juxtaposition therewith; whereby, when each balloon is inflated the rigid rod-like balloon former defining means establish at least one (1) lineal barrier precluding distension of each balloon along that lineal barrier while permitting distension of each balloon as lobes formed on either side of the barrier so as to cause the inflated balloon to assume a nonspherical configuration which: (i) substantially conceals the rigid rod-like balloon former defining means; and (ii), conforms in shape to the shape of at least a portion of the desired sculpture.

4,927,401

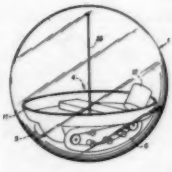
RADIO CONTROLLABLE SPHERICAL TOY

Harald V. Sonesson, Stenåldersvägen 131, S-222 54 Lund, Sweden

Filed Aug. 8, 1989, Ser. No. 390,773

Int. Cl.[5] A63H *30/04, 17/00, 17/14*; A63G *25/00*

U.S. Cl. 446—456 **4 Claims**



1. A radio-controllable substantially spherical toy comprising a hollow, substantially spherical toy body having an inner surface substantially concentric with an outer surface thereof and a predetermined diameter of the inner surface of said body containing a radio controlled vehicle having means frictionally engaging said inner surface for causing relative movements between said vehicle and said body, characterized in that said means consist of two endless bands each said band engaging the inner surface for traction and being wrapped around a

system of a plurality of support wheels and at least one driving wheel defining an arced length, said endless bands having such dimensions that a maximum distance between end points of said arcedlength, of engagement between said bands with the inner surface of said body is less than 80% of the diameter of the inner surface of said body.

4,927,402

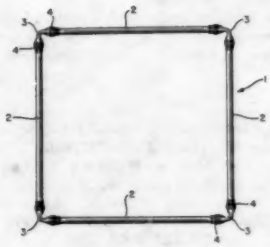
RECONFIGURABLE LOOP APPARATUS

Wylci Fables, and Jore Park, both of 4040 Galt Ocean Dr., Apartment 918, Fort Lauderdale, Fla. 33308

Continuation of Ser. No. 144,947, Jan. 19, 1988, abandoned. This application Jul. 19, 1989, Ser. No. 383,244

Int. Cl.[5] A63H *33/00*

U.S. Cl. 446—487 **12 Claims**



1. Apparatus comprising:

first, second, third and fourth elongated members, each member having first and second ends;

first, second, third and fourth couplings, said first coupling joining the first end of said first member to the first end of said second member, said second coupling joining the second end of said second member to the first end of said third member, said third coupling joining the second end of said third member to the first end of said fourth member, said fourth coupling joining the second end of said fourth member to the second end of said first member, whereby said couplings join the ends of the members together to form a closed loop, each coupling being twistable and bendable such that by bending of the coupling each member joined by the coupling can be moved through an angle of substantially 360° in substantially all directions relative to the other member joined by the coupling;

whereby the closed loop of joined elongated members can be reconfigured into a variety of shapes.

4,927,403

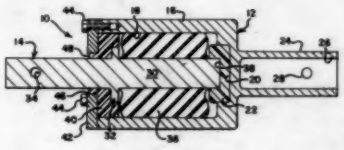
HIGH VOLTAGE INSULATIVE SHAFT COUPLER

Kenneth D. Pate, Sr., 801 Greenwood Ave. East, Waukegan, Ill. 60087

Continuation-in-part of Ser. No. 17,446, Feb. 24, 1987, abandoned. This application Nov. 18, 1988, Ser. No. 273,420

Int. Cl.[5] F16D *3/76, 7/02*

U.S. Cl. 464—30 **8 Claims**



1. A high voltage electrically insulative shaft coupler, comprising

a. A first coupler element having a hollow housing, said housing including a cylindrical interior cavity having an inner diameter of a first dimension,

b. a second coupler element including an elongated shaft, said shaft being formed to fit within said cavity, and

c. a cylindrical, flexible elastomeric retention member secured to said shaft, and said retention member having an outer diameter of a second dimension, said second dimension being greater than said first dimension, said retention member being formed of a dielectric material capable of withstanding high voltage of on the order of 50 kilovolts without breakdown,

d. said shaft retention member being installed axially within said housing cavity; such that said retention member is compressed so that the outer diameter of said retention member is equal to said first dimension, whereby said retention member and said shaft will be axially rotated when said first coupler element housing is rotated,

e. a dielectric first guide means located centrally adjacent the bottom of said cavity in axial registration with the interior of said cavity and with the end of said shaft within said cavity, said first guide means being capable of withstanding high voltage and being formed to receive said shaft end and being sufficiently hard and unyielding to retain said shaft end in position in axial registration with the interior of said cavity and prevent substantial lateral movement thereof,

f. a dielectric guide collar adjacent the top of said cavity in close fitting relationship with the cavity defining portions of said hollow housing and in close fitting surrounding relationship with respect to said shaft, said guide collar being capable of withstanding high voltage and being sufficiently hard and unyielding to prevent substantial lateral movement of the portions of said shaft adjacent the top of said cavity, and

g. retaining means for retaining said guide collar in place adjacent the top of said cavity,

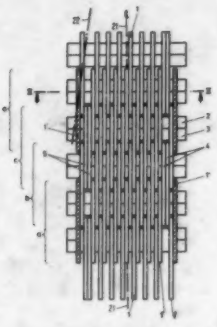
h. whereby said second coupler element shaft will be held in place and prevented from substantial lateral movement by said first guide means adjacent the bottom of said cavity and by said guide collar adjacent the top of said cavity and will be electrically insulated from said first coupler element by said first guide means, said guide collar and said intermediate elastomeric retention member.

4,927,404

LINK CHAIN FOR AN INFINITELY VARIABLE CONE DRIVE DISK TRANSMISSION

Manfred Rattunde, Bad Homburg, Fed. Rep. of Germany, assignor to Reimers Getriebe AG, Zug, Switzerland

Filed Jul. 11, 1989, Ser. No. 378,362
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1988, 3826809
Int. Cl.[5] F16G 1/24
U.S. Cl. 474—242 16 Claims



1. Link chain for an infinitely variable cone drive disk transmission having

a plurality of plate-like links, formed with openings therein;

connecting joint elements (2, 3) fitted into said openings,

said connecting joint elements, in operation of the chain and upon placement between the drive disks (30), transferring by frictional force torque between the drive disks and the link chain by engagement of the end surfaces of the connecting joint elements with the faces of the drive disks,

wherein the links are located next to each other such that the overall cross section of the links transferring said forces and engaged by the connecting joint elements is essentially constant;

the links are located longitudinally staggered along the length of the chain in groups (a,b,c;d,e) and so positioned that a theoretical line (22, 522) connecting the centers of gravity of laterally adjacent links extends at an inclination with respect to the longitudinal direction of the chain; and

wherein those groups (b,c;e) of the groups of the links(a,b,c;d,e) which have an overall cross section smaller than that group (a;d)of the links which have the largest cross section includes links (4, 5, 6, 6',10) positioned at outer sides of the chain which are structurally stronger than the links (1, 8) positioned inwardly of the outer links.

4,927,405

PROTECTIVE LABORATORY SPECIMEN BAG

Kenneth W. Martin, 4857 Coach Hill Dr., Greenville, S.C. 29615, and Jonathan T. McClure, P.O. Box 26838, Greenville, S.C. 29616

Filed Jul. 1, 1988, Ser. No. 214,520
Int. Cl.[5] B31B 27/64, 27/14
U.S. Cl. 493—194 11 Claims

6. A method for producing a unitary specimen bag for packaging a laboratory specimen container and associated paper work comprising:

supplying plastic folded tubing having first and second side walls with a resealable lock having opposed linear mating portions carried by said first and second side walls;

supplying plastic folded sheeting having a third side wall and fourth side wall which includes a reverse flip;

feeding said folded tubing and sheeting in a superposed manner to heat seal means;

forming a first heat seal across said second, third, and fourth side walls of said superposed sheeting and tubing;

forming a plurality of spaced second heat seals on said superposed sheeting and tubing transverse to said first heat seal to form a first compartment between said first and second

side walls and a second compartment between said third and fourth side walls; and

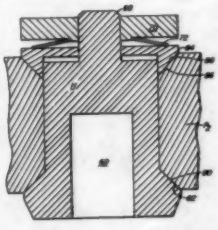
forming said first heat seal in such a manner to form a closed top composite bag with said reverse flip forming a side mouth opening for said second compartment.

4,927,406

SPRING BIASED DRIVE SOCKET INSERT FOR CENTRIFUGE ROTORS

Stefan J. Glen, Palo Alto, and William E. Ellison, San Mateo, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Dec. 15, 1988, Ser. No. 284,974
Int. Cl.[5] B04B 9/00
U.S. Cl. 494—84 7 Claims



1. In a centrifuge rotor having a rotor body and a drive hub socket, the rotor construction comprising;

a rotor body, said rotor body fabricated of a composite material and symmetrically formed with respect to a spin axis of said rotor and defining at least one aperture for receiving materials to be separated;

at least one substantially conical aperture concentric to the spin axis of said rotor defined in said rotor body for receiving a rotor drive hub socket to said rotor body;

a rotor drive hub socket, said rotor drive hub socket defining an aperture for mating to the centrifuge drive hub for rotating said rotor body through said spindle, said aperture concentric to the spin axis of said rotor as defined through said drive hub socket;

said rotor drive hub socket further defining a substantially conical mating surface to the substantially conical aperture of said rotor body; said mating surface defined on the exterior of said rotor drive hub socket for forming contact with the substantially conical aperture of said rotor body,

said mating surface concentric to the spin axis of said rotor; and

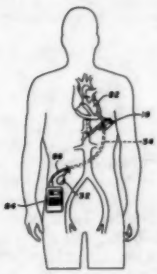
spring means operatively connecting said drive hub socket and said rotor body for urging said substantially conical surfaces into contact during the spinning of said rotor, said substantially conical surface given a respective slope to prevent self-locking upon relative movement between said rotor body and drive hub socket and to permit dynamic self-centering sliding contact at said substantially conical surfaces during dynamic differential expansion of said apertures one with respect to another.

4,927,407

CARDIAC ASSIST PUMP WITH STEADY RATE SUPPLY OF FLUID LUBRICANT

Frank Dorman, Minneapolis, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Jun. 19, 1989, Ser. No. 367,960
Int. Cl.[5] A61F 2/22
U.S. Cl. 600—16 **21 Claims**



1. A system for conveying bodily fluid including:

a pump having a housing defining a first chamber, a second chamber, a first inlet passageway in fluid communication with said first chamber for admitting a bodily fluid into said first chamber, a first outlet passageway in fluid communication with said first chamber for expelling said bodily fluid out of the first chamber, and a second inlet passageway in fluid communication with said second chamber for admitting a fluid lubricant into the second chamber, said lubricant being biocompatible and soluble in said bodily fluid;

an impeller mounted rotatably in said first chamber, a rotor mounted to rotate in said second chamber, and a connecting means for coupling said impeller to rotate responsive to rotation of said rotor;

an elastically deformable sealing means fixed to said housing, disposed between said first chamber and said second chamber, and forming an interface with said connecting means, said sealing means normally in a surface engagement with said connecting means along said interface;

a supply means for supplying said lubricant at a first predetermined constant fluid flow rate through the second inlet passageway into said second chamber, to cause a perfusion of said lubricant along said interface and into said first chamber at a second constant fluid flow rate, thus to elastically deform said sealing means and maintain said sealing means in close, spaced apart relation to said connecting means against a restoring force in said sealing means tending to restore said surface engagement, so long as said perfusion continues; and

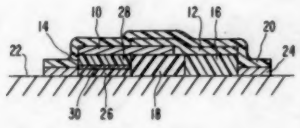
a drive means for rotating said rotor to convey said bodily fluid through said first chamber and said first inlet and outlet passageways.

4,927,408

ELECTROTRANSPORT TRANSDERMAL SYSTEM

Ronald P. Haak, Cupertino; Felix Theeuwes, and J. Richard Gyory, both of Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed Oct. 3, 1988, Ser. No. 252,463
Int. Cl.[5] A61N 1/30
U.S. Cl. 604—20 **21 Claims**



1. An electrotransport system for placement on a body surface and delivering an agent through said surface, the system comprising:

a non-conductive backing member;

a source of electrical power comprising first and second current conducting members, said current conducting members being positioned adjacent to said backing member;

a first electrode pad comprising a first reservoir containing an electrolyte and a second reservoir containing the agent, said electrolyte-containing reservoir, positioned adjacent to said first current conducting member and said agent-containing reservoir adapted to be positioned in current conducting relationship to said body surface;

a selectively permeable membrane separating the first and second reservoirs from one another, the membrane comprising a microporous polymer which is impermeable to the agent and to chemical species having a molecular weight greater than a predetermined molecular weight and permeable to chemical species having a molecular weight less than the predetermined molecular weight;

a second electrode pad positioned adjacent to said second current conducting member and adapted to be positioned in current conducting relationship to said body surface;

an insulating means electrically insulating said first and said second electrode pads from each other; and

a means for maintaining said system in current conducting and agent transmitting relationship to said body surface.

4,927,409

Patent Not Issued For This Number

4,927,410

METHOD FOR FABRICATING PROSTHESIS MATERIAL

Stephen G. Kovacs, Oldsmar, Fla., assignor to University of South Florida, Tampa, Fla.

Filed Nov. 18, 19[illegible], Ser. No. 273,298
Int. Cl.[5] A61F *2/06, 2/04*
U.S. Cl. 600—36 **23 Claims**

1. Method of fabricating prosthesis material for use with a living body which comprises:

(a) preparing a polymerizable thermosetting material by mixing components thereof at about ambient temperature and about atmospheric pressure;

(b) introducing the thermosetting material to the surface of tubular forming means having notability about a substantially horizontal axis thereby forming a relatively thin film of thermosetting material thereon;

(c) subjecting the thin film to sub-atmospheric pressure at about ambient temperature thereby imparting isotropic characteristics to the film;

(d) contacting the thin film with wiper means in order to remove excess material from the film thereby achieving desired film thickness; and

(e) curing the thin film to a stable physical structure of prosthesis material.

4,927,411

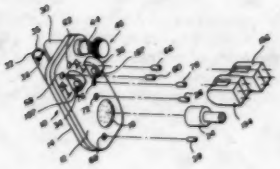
DRIVE MECHANISM FOR DISPOSABLE FLUID INFUSION PUMPING CASSETTE

John Pastrone, Los Gatos, and Edward Laenen, Palo Alto, both of Calif., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed May 1, 1987, Ser. No. 45,924
Int. Cl.[5] A61M *31/00*
U.S. Cl. 604—65 **13 Claims**

1. A mechanism for actuating a plunger-type slideable valve on a valving device, comprising

a moveable support associated with said mechanism for holding said valving device;



a moveable gripping means on said mechanism for gripping said valve; and

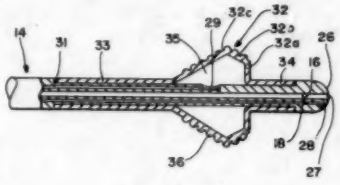
a linking means between said moveable support and said gripping means to transmit the movement of said support to said gripping means whereby a valving device can be placed in said moveable support, said gripping means can engage said valve and slide said valve as said moveable support is moved, said linking means transmitting the movement of said moveable support to said gripping means to slide said valve.

4,927,412

CORONARY SINUS CATHETER

Philippe Menasche, Paris, France, assignor to Retroperfusion Systems, Inc., Costa Mesa, Calif.

Filed Dec. 8, 1988, Ser. No. 282,004
Int. Cl.[5] A61M *25/00*
U.S. Cl. 604—96 **8 Claims**



1. In a coronary sinus catheter, a flexible elongate member having proximal and distal extremities, the flexible elongate member having at least two lumens extending longitudinally thereof, a balloon mounted on the distal extremity of the flexible elongate member and having its interior in communication with one of the lumens, the balloon having at least one truncated conical surface having outwardly facing spaced apart parallel concentric lands formed thereon for frictionally engaging the coronary sinus to provide a high retentive force for the catheter.

4,927,413

CATHETER FOR BALLOON ANGIOPLASTY

Robert Hess, Portola Valley, Calif., assignor to Progressive Angioplasty Systems, Inc., Menlo Park, Calif.

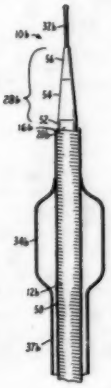
PCT No. PCT/US88/02826, § 371 Date Nov. 21, 1988, § 102(e) Date Nov. 21, 1988
Continuation-in-part of Ser. No. 88,264, Aug. 24, 1987, Pat. No. 4,808,164. This PCT application Aug. 24, 1988, Ser. No. 299,149
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.
Int. Cl.[5] A61M *25/00*
U.S. Cl. 604—95 **10 Claims**

1. A catheter for balloon angioplasty comprising:

a flexible shaft having a sealed hollow passage defined therein and having a first proximal end and a second distal

end, both said ends being open, said flexible shaft being a coated wire wound member, said coating being fluid impervious and extending along substantially the entire length of the wire wound member, the wire wound member being substantially round in cross-section and resistant to flattening in cross-section when said flexible shaft is bent along the length thereof in the tortuous path of a coronary artery, allowing close tolerances for a member that may be inserted therein, the coated wire wound member inherently having high column strength providing pushability while maintaining a high degree of flexibility and being resistant to a preset in overall shape when the catheter is coiled for storage;

a core means movably, removably and substantially contained within said flexible shaft, said core means having a first proximate end and a second distal end and having a first flexible portion extending from said first proximate end and a second flexible portion terminating in said second distal end of said core means, said second flexible portion being of greater flexibility than said first flexible portion, said second flexible portion having a variable core strength along the length thereof from greater to lesser strength extending toward the second distal end of said core means, said second flexible portion being tapered along the length thereof such that essentially all of said second flexible portion can generally be extended within a coronary artery to maximize the variable stiffness of said catheter, the combination of the core means and the coated wire wound member providing variable trackability, pushability and flexibility of said catheter;



a flexible guide wire fixed to and further axially extending from the second distal end of said core means; and

an inflatable member having a non-inflatable sheath covering an external surface of said flexible shaft near the second distal end of said flexible shaft and further including means for inflating said inflatable member.

4,927,414

SYRINGE WITH SAFETY RETRACTING NEEDLE

John C. Kulli, 1920 Spruce St., South Pasadena, Calif. 91030

Continuation-in-part of Ser. No. 43,691, Apr. 29, 1987, Pat. No. 4,747,831. This application May 27, 1988, Ser. No. 199,694

Int. Cl.[5] A61M *5/24*

U.S. Cl. 604—110 **26 Claims**

1. A safety device for use in injecting liquid into or withdrawing liquid from a patient and for thereafter protecting people from contact with portions of the device that have been within the patient; said device comprising:

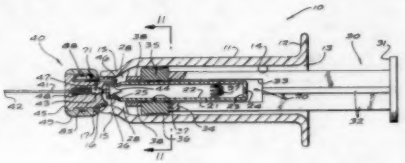
a hollow needle for piercing such patient and for guiding and carrying such liquid into or out of the patient, said needle having a hollow shaft with at least one sharp end;

a syringe that includes:

a syringe barrel for containing a quantity of such liquid, and

a syringe plunger disposed at least partially within the syringe barrel and adapted to be moved forward within the syringe barrel to drive such liquid out of the syringe barrel and through the hollow shaft into such patient;

means for securing the needle shaft to the syringe barrel, with the sharp end projecting from the syringe barrel; and



manually actuable means for releasing the securing means and for substantially permanently retracting the sharp end of the needle into the syringe and beyond reach of such people's fingers;

wherein the plunger is relieved to permit retraction of the sharp end of the needle by the releasing and retracting means into a space within the syringe, while the plunger is disposed forward within the syringe barrel; and

wherein the releasing and retracting means are manually actuable by a simple unitary motion, of amplitude that is substantially shorter than the shaft of the needle.

4,927,415

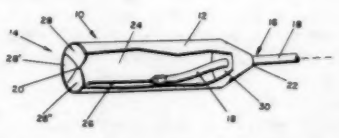
APPARATUS FOR SAFE USE AND DISPOSAL OF NEEDLES

Stuart A. Brodsky, 2556-H Navarra Dr., Carlsbad, Calif. 92009

Filed Aug. 12, 1988, Ser. No. 231,782

Int. Cl.[5] A61M *5/18*

U.S. Cl. 604—164 **21 Claims**



17. An apparatus for the use of safely administering or withdrawing fluids through an intravenous needle and the safe disposal of said intravenous needle comprising:

an intravenous needle;

needle-safe containment means comprising a longitudinal body having first and second ends, entry and closure means disposed at said first end for allowing said needle to enter said longitudinal body and for denying exit of said needle therethrough, and aperture means at said second end of said longitudinal body;

discrete needle pulling means attached to said needle and passed through said entry and closure means and said aperture means for drawing said needle into said longitudinal body for safe positioning and disposal of said needle within said needle-safe containment means after use of said needle;

fluid movement means attached to said needle pulling means exiting said second end of said longitudinal body for causing fluid to flow into or from a patient.

4,927,416

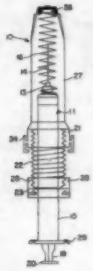
USER-PROTECTIVE HYPODERMIC SYRINGE HOLDER

Stanley Tomkiel, South Hempstead, N.Y., assignor to National Medical Device Corporation, Valley Stream, N.Y.

Continuation-in-part of Ser. No. 127,689, Dec. 2, 1987, abandoned. This application Aug. 10, 1988, Ser. No. 230,796

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—198 **21 Claims**



1. A user-protective holder for use with a hypodermic syringe having a barrel, finger flanges projecting out from the barrel adjacent one end thereof and a coupling for receiving a needle at the other end of the barrel, and a plunger received in the barrel, comprising a unitary tubular holder member adapted to be received over the syringe barrel with a proximate portion closely adjacent the gripping flanges and a distal end closely adjacent the distal end of the barrel, leaving the needle substantially fully exposed for use, coupling means including a coupling element engageable with the finger flanges of the barrel for securing the holder member to the syringe barrel, a tubular protective sheath received over the barrel in a retracted position in which the needle is exposed for use and movable along the barrel to an extended position in which the needle is received entirely within the sheath such that the sheath protects the user against needle pricks, releasable latch means for coupling the sheath to the holder member in the retracted position, the latch means and coupling means being adapted to enable the holder member and sheath to be preassembled to each other before the syringe is inserted into and coupled to the holder member, and means for holding the sheath in the extended position upon release of the latch means and movement of the sheath to the extended position.

4,927,417

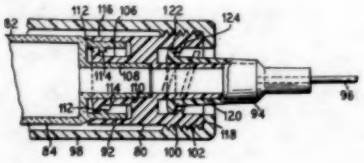
SAFETY SLEEVE ADAPTER

Elizabeth Moncada, and Michael B. Schneider, both of Chicago, Ill., assignors to Schneider Medical Technologies, Inc., Chicago, Ill.

Filed Jul. 7, 1988, Ser. No. 216,001

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—198 **9 Claims**



1. An adapter for selective engagement with a sleeve for protective shielding of a needle, comprising:

an adapter body;

a connector portion on said adapter body;

means for removably mounting a needle on said adapter body, said means for removably mounting a needle including a female portion of a Luer lock connector for receiving a cooperating male portion of a Luer lock connector having said needle integral therewith; and

means on said adapter body for selective engagement with said sleeve when said sleeve is in a forward position shielding said needle.

4,927,418

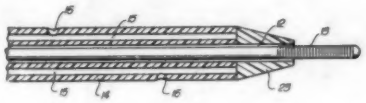
CATHETER FOR UNIFORM DISTRIBUTION OF THERAPEUTIC FLUIDS

Michael D. Dake, Miami, Fla., and Mark A. Maguire, San Jose, Calif., assignors to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Filed Jan. 9, 1989, Ser. No. 295,088

Int. Cl.[5] A61M *5/325*

U.S. Cl. 604—264 **14 Claims**



1. A multilumen vascular catheter for the uniform delivery of fluid containing drugs, therapeutic agents and the like comprising an elongated tubular body having a first lumen for receiving a guidewire to facilitate the advancement of the catheter through a patient's vasculature and a plurality of second lumens, each of said second lumens having in fluid communication therewith a single flow passageway extending through the wall of the tubular body to the exterior thereof with the flow passageways being longitudinally spaced from each other so that a uniform flow of fluid is discharged over a length of the catheter.

4,927,419

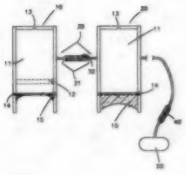
SUSTAINED RELEASE MEDICATING DEVICE FOR LIVESTOCK

Marian O. Scully, Estancia, N. Mex., assignor to Agri Research and Development, Tucson, Ariz.

Filed Apr. 24, 1987, Ser. No. 42,314

Int. Cl.[5] A61K *9/22*; **A01N** *17/00*

U.S. Cl. 604—892.1 **3 Claims**



1. In an osmotic dispensing device for the dispensing of a substance into the body, the improvement comprising a second osmotic dispensing device linked to said osmotic dispensing device through a bioerodible connecting strand, said connecting strand comprising a material which will be degraded by said body to cause the separation of said osmotic dispensing device from said second osmotic dispensing device after said substance has been dispensed into said body.

4,927,420

ULTRA-SHARP TUNGSTEN NEEDLE FOR ELECTROSURGICAL KNIFE

John B. Newkirk, Evergreen, Colo., and Kim H. Manwaring, Scottsdale, Ariz., assignors to Colorado Biomedical, Inc., Evergreen, Colo.

Filed Nov. 14, 1988, Ser. No. 271,235
Int. Cl.[5] A61B *17/36*
U.S. Cl. 606—45 **13 Claims**

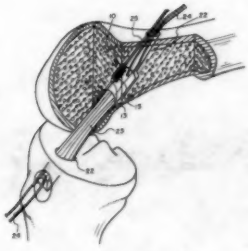
1. An electrosurgical electrode composed of a refractory alloy comprising a solid needle with a blunt end and a tip end, the tip radius of said tip end being less than 50 microns.

4,927,421

PROCESS OF ENDOSTEAL FIXATION OF A LIGAMENT

E. Marlowe Goble, 850 E. 1200 North; W. Karl Somers, 651 N. 150 West, both of, Logan, Utah 84321, and David McGuire, 3418 Lakeside Dr., Achorage, Ak. 99515

Filed May 15, 1989, Ser. No. 352,153
Int. Cl.[5] A61F *2/08*
U.S. Cl. 606—73 **4 Claims**



1. A process of endosteal fixation of a ligament within the interior of a bone mass comprising, forming a ligament tunnel through adjacent bone masses; fitting a ligament under tension in said ligament tunnel, extending between said adjacent bone masses; and turning a threaded device into one end of said ligament tunnel, guiding it alongside the ligament, such that the threads of said threaded device turn into said tunnel wall and a bone block end portion of said ligament.

4,927,422

ELBOW ARTHROPLASTY INSTRUMENTATION AND SURGICAL PROCEDURE

John A. Engelhardt, Warsaw, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.

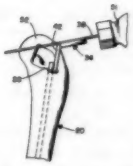
Filed Aug. 31, 1989, Ser. No. 401,634
Int. Cl.[5] A61F *5/04*
U.S. Cl. 606—79 **3 Claims**

1. A surgical procedure of modifying injured or diseased geometry existing at the distal end of a humerus in preparation for fixation thereto of a replacement for an elbow joint comprising the steps of:

(a) forming a through hole in the superior aspect of the olecranon fossa of the humerus aligned with the longitudinal axis thereof and in communication with the humeral canal;

(b) inserting into the humeral canal via the through hole formed in step (a) the stem of a distal cut guide tool including a platform having a planar guide surface until the planar guide surface is generally coplanar with the junction of the medial epicondyle and the trochlea such that, in an anterior view, the planar guide surface generally assumes the normal valgus angle of a healthy humerus and such that, in a lateral view, the planar guide surface generally assumes the anterior angle of inclination of a healthy humerus;

(c) forming a first resected surface by sawing into the distal end of the humerus along a plane coextensive with the



planar guide surface and generally parallel to the anatomical center of rotation of the elbow joint and removing the excess bone;

(d) withdrawing the distal cut guide tool from the humerus;

(e) inserting into the humeral canal via the through hole formed in step (a) the stem of a broach and chamfer cut guide tool including a slotted chamfer guide block integral with the head of the stem until the chamfer guide block is contiguously positioned on the first resected surface formed in step (c);

(f) forming a plurality of second resected surfaces by sawing into the distal end of the humerus as guided by the slotted chamfer guide block;

(g) withdrawing the broach and chamfer cut guide tool from the humerus;

(h) removing the excess bone resulting from step (f); and

(i) removing an excess amount of anterior and posterior bone adjacent the second resected surfaces for reception of the trial prosthesis on the modified distal end of the humerus.

4,927,423

CONNECTOR AND A DISPOSABLE ASSEMBLY UTILIZING SAID CONNECTOR

Bengt Malmborg, Helsingborg, Sweden, assignor to Aktiebolaget Leo, Helsingborg, Sweden

Filed May 11, 1988, Ser. No. 193,282
Claims priority, application Sweden, Sep. 18, 1986, 8603928; Dec. 9, 1986, 8605259
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—88 **11 Claims**

1. A connecting mechanism adapted to provide fluid communication between first and second containers closed by means of pierceable closure associated with outwardly-directed flange portions, with one of the containers having a plunger means movable within the container, comprising:

(a) a first holding means with first and second end portions, the first end portion end portion being closed and the second end portion being adapted to receive a container with a plunger means associated therewith;

(b) piercing means connected to the closed first end portion

of the first holding means, including a first piercing member projecting toward the first holding means and a second piercing member projecting away from the first holding means, the first and second piercing members being in fluid communication with each other;

(c) second holding means connected to the first holding means for holding the other container relative to the second piercing member;

(d) the first and second holding means including positioning

means for selectively holding the containers in a retracted position relative to their respective piercing members where the piercing members do not pierce the pierceable closures, and an inserted position where the piercing members pierce the pierceable closures and are in fluid communication with the interior of the containers;

(e) said second piercing member comprising cannula holding means for receiving and holding a cannula in fluid communication with the second piercing member after said other container is removed.

4,927,424

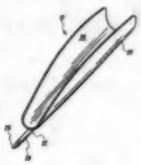
REAMER GUIDE FOR INTRAMEDULLARY NAIL PLACEMENT

Bernard E. McConnell, Rte. 2, Box 87, and John C. McConnell, 614 Mink Dr., both of Greenville, Tex. 75401

Filed Jul. 26, 1988, Ser. No. 224,451

Int. Cl.[5] A61B *17/56*

U.S. Cl. 606—96 **4 Claims**



1. Orthopedic surgery apparatus for guiding extension and retraction of a reaming tool through an opening defining an entrance to the intramedullary canal of a fractured bone, said apparatus comprising, in combination:

an elongated guide chute having an open shell defining a trough which is concave in cross section, and having a nose portion adapted for placement adjacent to said entrance opening against the surface of a fractured bone; and,

an elongated pin attached to said shell, said elongated pin having a piercing end portion projecting in alignment with the longitudinal axis of said elongated guide chute, said piercing end portion being adapted for insertion into the bone in the proximate vicinity of said entrance opening for securing said chute in longitudinal alignment with said intramedullary canal.

4,927,425

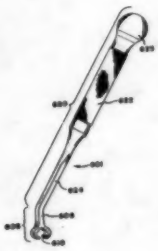
SURGICAL ROD PUSHER INSTRUMENT

Antony J. Lozier, Warsaw, Ind., assignor to Zimmer, Inc., Warsaw, Ind.

Filed Dec. 21, 1988, Ser. No. 287,243

Int. Cl.[5] A61B *17/56*

U.S. Cl. 606—99 **7 Claims**



1. A surgical rod pusher instrument for application of force against a rod, the instrument comprising a distal tip and an elongated handle extending therefrom, the tip including a rod receiving opening leading into an enlarged cavity, the cavity including a plurality of discrete rod locator recesses wherein each discrete recess is substantially semi-cylindrical and each discrete recess has a different directional orientation.

4,927,426

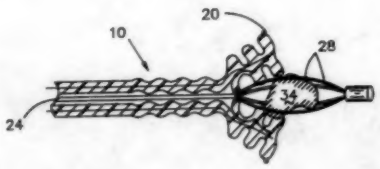
CATHETER DEVICE

Stephen P. Dretler, 7 Deer Run, Wayland, Mass. 01778

Filed Jan. 3, 1989, Ser. No. 292,910

Int. Cl.[5] A61B *17/22*

U.S. Cl. 606—128 **9 Claims**

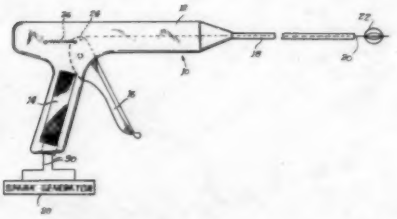


1. A catheter device for capturing and holding kidney stones and the like within a body passage said device comprising in combination an elongated tube for insertion into a body passage said tube having distal and proximal ends wherein the length of said tube is such that said distal end is disposed within said body passage and said proximal end is disposed outside of said body passage; an axially inwardly collapsable cuff portion disposed adjacent the distal end of said tube, said cuff portion being an expanded portion of said tube wall and terminating in a free end; and snare means disposed within said tube and movable axially therein, said snare means comprising a second hollow elongated tube having a capturing head disposed at its distal end, said capturing head being disposed about the opening of said second hollow elongated tube wherein said capturing head with a kidney stone or the like held therein when moved outwardly of said body passage towards said expanded portion causes the free end of said cuff portion of said elongated tube to collapse axially inwardly into said expanded portion so as to envelope said capturing head and kidney stone or the like.

4,927,427
LITHOTRIPTOR DEVICE FOR TRAPPING AND DESTROYING CONCRETIONS

G. Vincent Kriauciunas, Westchester, and Karen Vance, Palatine, both of Ill., assignors to Northgate Research, Inc., Arlington Heights, Ill.

Filed Sep. 29, 1989, Ser. No. 414,396
Int. Cl.[5] A61B *17/22*
U.S. Cl. 606—128 11 Claims



1. An electrohydraulic lithotriptor device to be used with an endoscope for trapping and destroying concretions such as kidney stones comprising:

a base part, having a manually operable trigger,

a flexible, insulating tubing, having one end connected to and extending from said base part and having the other end adapted to be positioned adjacent a concretion by insertion through said endoscope,

an electrically conductive wire, extending and axially movable through and beyond said tubing and having an exposed end,

a stone trapping device secured to said wire adjacent said exposed end and adapted to trap said concretion,

an electrode carried by said tubing, adjacent said exposed end, said wire being retractable to pull said concretion trapped by said stone trapping device into close proximity to said other end of said tubing and to said electrode,

means on said base part, and controlled by said trigger, for extending and retracting said wire,

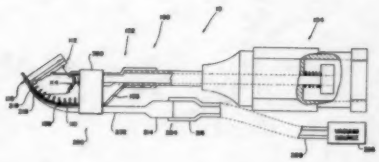
a spark generator,

and means extending through said base part and said tubing for electrically connecting said wire and said electrode to said spark generator for causing a succession of sparks to jump between said wire and said electrode adjacent said other end of said tubing to generate a shock wave adjacent said concretion to effect destruction thereof.

4,927,428
SURGICAL SUTURING SYSTEM AND PROBE ASSEMBLY

William D. Richards, Medway, Mass., assignor to Ophthalmic Ventures Limited Partnership, Norwood, Mass.

Filed Oct. 7, 1988, Ser. No. 255,541
Int. Cl.[5] A61B *17/00, 17/04*
U.S. Cl. 606—148 9 Claims



1. A probe assembly for positioning and holding human and animal tissue for suturing, the probe assembly comprising an elongated body having a hollow interior, a narrowed working end, and a rear end, said working end including (a) a suction head having a long, narrow slot coupling said interior of said body with the region outside said body, said slot being positioned so that an axis extending along the long dimension of the slot extends perpendicular to the elongate axis of said body, and (b) a flat supporting member positioned forward of said slot, said rear end comprising an opening and being adapted for attachment to a vacuum source so as to couple said hollow interior with said vacuum source.

4,927,429

PROCESS OF DYEING SYNTHETIC FABRICS USING HIGH-BOILING ESTER SOLVENTS

George L. Brodmann, Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed May 4, 1987, Ser. No. 45,557
Int. Cl.[5] D06P 1/46
U.S. Cl. 8—583 6 Claims

1. A process of dyeing polyester or nylon comprising exposing polyester or nylon fibers at elevated temperatures to a waterless coloring composition composed of a high-boiling ester solvent and a dye at elevated temperatures, in which the dye:

(1) is a nonionic dye or a premetallized solvent dye that is soluble in the solvent tris(2-ethylhexyl) trimellitate at 350° F. to the extent of at least 2.0 by weight, based on the weight of the solvent;

(2) provides a depth of coloration, calculated as the quotient of the integrated depth value of a sample in the solvent divided by the integrated depth value of the same weight of a proven disperse dye of the same or substantially the same color, expressed as % yield, of at least 25%;

(3) dyes the polyester or nylon fibers to a lightfastness value, according to AATCC Test Method 16A-1982 for 40 hours of exposure, of at least 3; and

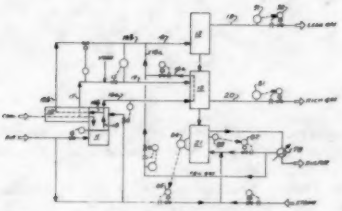
(4) provides a washfastness value of at least 3 according to AATCC Test Method 61-1985-IA.

4,927,430

METHOD FOR PRODUCING AND TREATING COAL GASES

Albert Calderon, P.O. Box 126, Bowling Green, Ohio 43402

Filed May 26, 1988, Ser. No. 198,862
Int. Cl.[5] C10J 3/62
U.S. Cl. 48—197 R 14 Claims



1. A method of generating a de-sulphurized volatile matter and a relatively low Btu gas comprising the steps of:

(a) pyrolyzing coal to produce volatile matter and a char;

(b) feeding the volatile matter to a first de-sulphurizing means containing a de-sulphurizing agent to remove sulphur from the volatile matter;

(c) gasifying the char to produce a relatively low Btu gas;

(d) feeding the relatively low Btu gas to a second de-sulphurizing means also containing the de-sulphurizing agent to remove sulphur from the relatively low Btu gas;

(e) providing a regenerating means for removing sulphur from the de-sulphurizing agent; and

(f) moving at least portions of the de-sulphurizing agent from the second de-sulphurizing means to the first de-sulphurizing means, from the first de-sulphurizing means to the regenerating means, and from the regenerating means to the second de-sulphurizing means.

12. A method of generating a de-sulphurized volatile matter and a relatively low Btu gas comprising the steps of:

(a) pyrolyzing coal to produce volatile matter and a char;

(b) feeding the volatile matter to a first de-sulphurizing means containing a de-sulphurizing agent to remove sulphur from the volatile matter;

(c) gasifying the char to produce a relatively low Btu gas;

(d) feeding a portion of the relatively low Btu gas about the first de-sulphurizing means to indirectly increase the temperature thereof;

(e) combining the portion of the relatively low Btu gas fed about the first de-sulphurizing means with the remaining portion of the relatively low Btu gas from step (c);

(f) feeding the combined portions of the relatively low Btu gas to a second de-sulphurizing means also containing the de-sulphurizing agent to remove sulphur from the relatively low Btu gas;

(g) providing a regenerating means for removing sulphur from the de-sulphurizing agent; and

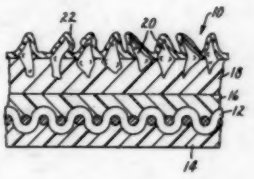
(h) moving at least portions of the de-sulphurizing agent among the first de-sulphurizing means, the second de-sulphurizing means, and the regenerating means such that the regenerating means regenerates the de-sulphurizing agent.

4,927,431

BINDER FOR COATED ABRASIVES

Scott Buchanan; Eric G. Larson; Jon R. Pieper, and Thomas E. Boettcher, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 8, 1988, Ser. No. 241,946
Int. Cl.[5] C09K 3/14
U.S. Cl. 51—298 24 Claims



1. An abrasive article comprising a backing and abrasive grains, wherein said abrasive grains are secured to at least one side of said backing by at least one binder prepared from a blend comprising

(1) at least one radiation curable monomer selected from the group consisting of:

(a) isocyanurate derivatives having at least one terminal or pendant acrylate group,

(b) isocyanate derivatives having at least one terminal or pendant acrylate group, and

(c) multifunctional acrylates having on average at least three pendant acrylate groups, and

(2) a thermally curable resin selected from the group consisting of phenolic resins, epoxy resins having an oxirane ring, urea-formaldehyde resins, melamine-formaldehyde resins, and polyimide resins.

4,927,432

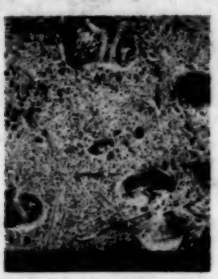
PAD MATERIAL FOR GRINDING, LAPPING AND POLISHING

William D. Bodinger, Kennett Square, Pa., and Elmer W. Jenson, Wilmington, Del., assignors to Rodel, Inc., Newark, Del.

Filed Mar. 25, 1986, Ser. No. 843,881
Int. Cl.[5] C09B 3/14
U.S. Cl. 51—298 19 Claims

1. A poromeric pad material comprising a porous thermoplastic resin matrix reinforced with a fiber network, said resin matrix being coalesced among the fibers to increase the poros-

ity and hardness of the material, wherein said resin matrix comprises a blend of at least two resins, one of said resins



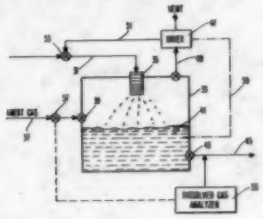
having a melting point higher than the other, whereby said higher melting point resin is not substantially coalesced.

4,927,433

APPARATUS FOR REMOVING GAS FROM A LIQUID

Rolf H. Wieland, Norristown, and Martin A. Krongold, Aston, both of Pa., assignors to MG Industries, Valley Forge, Pa.

Filed May 22, 1989, Ser. No. 355,192
Int. Cl.[5] B01D *19/00*
U.S. Cl. 55—18 **4 Claims**



1. A process for removing za gas from a liquid, the gas being initially dissolved in the liquid, the method comprising the steps of:

(a) directing the liquid to an opening in a container, the opening having an atomizer mounted therein, such that the liquid entering the container is substantially atomized,

(b) introducing an inert gas into the container, the inert gas being introduced in sufficient quantity to cause the dissolved gas to separate from the liquid,

(c) venting gas from the container,

(d) permitting the degassed atomized liquid to accumulate at the bottom of the container,

(e) withdrawing at least some of the liquid from the container,

(f) measuring the amount of dissolved gas remaining in the liquid being withdrawn from the container, and

(g) adjusting the flow rate of inert gas into the container, until the amount of dissolved gas in the liquid being withdrawn from the container has reached a desired level.

4,927,434

GAS COMPONENT EXTRACTION

Harry D. Cordes, Largo; Michael B. Duich, Palm Harbor, and Gardner S. Bailey, Pinellas Park, all of Fla., assignors to Pall Corporation, Glen Cove, N.Y.

Filed Dec. 16, 1988, Ser. No. 285,162
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—20 **23 Claims**

1. A method of optimizing the production of a product gas mixture in a pressure swing apparatus including two regenerable sorbent beds from an inlet gas mixture from which the sorbent beds extract a component to produce the product gas mixture comprising:

extracting a component from a pressurized inlet gas mixture by passing it through a first sorbent bed during an adsorption interval thereby producing a product gas mixture;

regenerating a second sorbent bed during the adsorption interval of the first sorbent bed including passing a quantity of the product gas from the first sorbent bed through the second sorbent bed in a reverse direction during a purging interval while the second sorbent bed is vented to the ambient;

alternating the first and second beds between adsorption and regeneration operations;

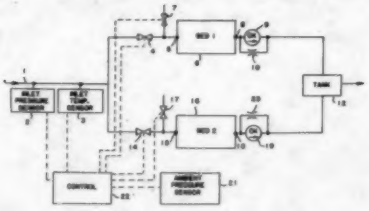
sensing the ambient pressure and the temperature and pressure of the pressurized inlet gas mixture;

determining from the sensed ambient pressure and the temperature and pressure of the pressurized inlet gas mixture and from the sorption characteristics of the sorbent beds the length of adsorbing and purging intervals that optimize the production of product gas; and

adjusting the adsorption and purging intervals of the first and second sorption beds to the respective determined intervals that optimize the production of product gas.

5. An apparatus for extracting a component from a gaseous mixture comprising:

first and second sorption beds, each bed having an inlet for admitting gas and an outlet for discharging gas, said beds for, in an operating condition, adsorbing a component from an inlet gas mixture and supplying as a product gas



the mixture from which the component has adsorbed, and for, in a regenerating condition, desorbing the adsorbed component;

an inlet conduit for supplying the inlet gas mixture to said inlets of said first and second beds;

first and second inlet valves connected between said inlet conduit and said inlets of said first and second beds, respectively, for selectively admitting the inlet gas mixture to said first and second beds;

first and second vent valves in fluid communication with said first and second beds, respectively, for venting said first and second beds to the ambient;

means for admitting product gas from one bed in an operating condition to the other bed in a regenerating condition to purge said other bed;

first and second sensors in fluid communication with said inlet conduit for sensing the pressure and temperature, respectively, of the inlet gas mixture supplied to said first and second inlet valves;

a third sensor for sensing ambient pressure proximate said first and second beds; and

control means, storing the sorption characteristics of said first and second beds as a function of ambient pressure and temperature and pressure of the inlet gas mixture, for determining, in response to said first, second, and third sensors and the sorption characteristics of said first and second beds, intervals for adsorption by and purging of said first and second beds and for actuating said first and second inlet and vent valves for cycling said first and

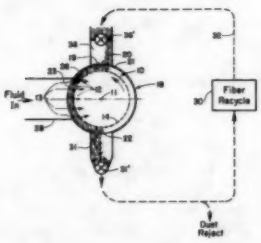
second beds between operating and regenerating conditions in accordance with the determined adsorption and purging intervals to optimize the production of product gas for the sensed inlet gas mixture and ambient conditions.

4,927,435

ROTATING DRUM FILTER

Donald Anson, Worthington, Ohio, assignor to Battelle Memorial Institute, Columbus, Ohio

Filed Mar. 31, 1989, Ser. No. 332,647
Int. Cl.[5] B01D *46/04*
U.S. Cl. 55—96 **9 Claims**



1. A method for removing a pollutant such as dust from a fluid stream comprising

providing a substantially cylindrical rotatable drum, positioned with its axis substantially horizontal, having openings for entering fluid in its cylindrical surface, and at least one opening for exiting fluid in an end surface,

providing a substantially cylindrical housing around the drum and coaxial therewith, having a supply opening for filter material in the upper part of its cylindrical surface, a removal opening for filter material in the lower part thereof, an inlet opening for fluid at least partly higher than the axis and generally between the filter material supply and removal openings, and at least one outlet opening for fluid in an end surface,

providing a continuous and substantially uniform array of loosely nested fibers through the filter material supply opening of the housing onto the cylindrical surface of the drum to form a filtering mat over a region thereof at least wide enough to meet all of the fluid that may pass through the fluid inlet in the housing,

rotating the drum about its axis to carry the nested fibers downward past the fluid inlet and thence to and out through the filter material removal opening of the housing, and

directing a stream of fluid into the fluid inlet of the housing, in through the adjacent mat of nested fibers and openings in the cylindrical surface of the drum, out through at least one opening in an end surface of the drum and through at least one outlet opening for fluid in an end surface of the housing, and away therefrom to means for utilizing the filtered fluid.

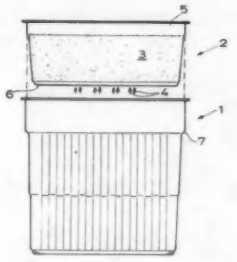
4,927,436

ROOM DEHUMIDIFIER

Peter O. Glienke, Baden-Baden, Fed. Rep. of Germany, assignor to Wenko-Wenselaar GmbH & Co. KG, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 302,779
Claims priority, application Fed. Rep. of Germany, Jul. 22, 1988, 8809377[U]
Int. Cl.[5] B01D *53/20*
U.S. Cl. 55—281 **19 Claims**

1. Room dehumidifier comprising a water collector having an open top end, an absorbent receptacle removably supported within the open top end of the water collector, and a water absorbent filler formed of a hygroscopic material disposed in said absorbent receptacle; wherein said receptacle has a water drainage opening in a bottom wall thereof and an open top end; wherein the water collector and absorbent receptacle are formed by containers that are circumferentially configured with respect to each other for enabling stackable nesting of the absorbent receptacle within the water collector but which have heights which differ in a manner so as to create a water collection space within the water collector below the absorbent receptacle when the absorbent receptacle is nested within



the water collector, wherein the water collector has a recessed abutment flange and the absorbent receptacle has a support flange near a bottom end thereof, said support flange being seated on said recessed abutment flange, and wherein the absorbent receptacle has a rim flange at its open top end and the distance between said rim flange and said support flange is greater than the distance between the open top end of the water collector and said recessed abutment flange, whereby said rim flange may be used for liftingly removing the absorbent receptacle from the water collector.

4,927,437

CYCLONIC SEPARATOR FOR REMOVING AND RECOVERING AIRBORNE PARTICLES

Ben M. Richerson, P.O. Box 2253, Sulphur Springs, Tex. 75482

Filed Feb. 21, 1989, Ser. No. 313,078
Int. Cl.[5] B01D *45/12*
U.S. Cl. 55—349 **24 Claims**

1. A cyclonic separator for removing particles from an air stream entering said separator, said separator comprising;

first and second spiral baffles adapted for mating engagement each one within the other for imparting a cyclonic flow to said air stream;

said first and second baffles are each constructed of a spiral shape comprising at least approximately 630° of curvature; and

said first baffle being disposed in an opposite direction of inwardly extending curvature relative to said second baffle to define a flow path with a concentric and spiral inlet passageway having a substantially uniform width to provide said cyclonic flow of said air stream therebetween whereby said air stream flowing with cyclonic motion in a first direction is reversed to flow with cyclonic motion in a second, opposite direction.

4,927,438

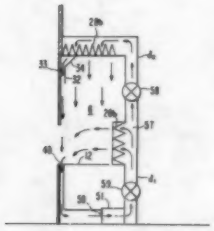
HORIZONTAL LAMINAR AIR FLOW WORK STATION

Eric L. Mears, Rockport, and Robert E. Jennings, Andover, both of Mass., assignors to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 126,656, Dec. 1, 1987, abandoned. This application Dec. 22, 1988, Ser. No. 290,889

Int. Cl.[5] B01D *50/00*

U.S. Cl. 55—385.2 **9 Claims**



1. A load station for semiconductor wafers comprising:

a chamber having an opening;

means for supporting at least one cassette for holding semiconductor wafers oriented horizontally in said chamber,

channel means comprising;

first channel means for directing a horizontal flow of air into said chamber toward a cassette supported by said means for supporting and toward said opening and

second channel means for directing a first stream of air to flow vertically

downward into said chamber; and

means for generating a second stream of air forming an air curtain having a velocity greater than the velocity of said first stream of air, said means for generating being capable of producing a downward velocity in said curtain of air sufficient to prevent said horizontal flow from penetrating said curtain of air so that the interior of said chamber is isolated from the environment external to said chamber opening;

said channel means including air return slot means in said chamber for receiving air from said horizontal flow, said first stream and said second stream.

4,927,439

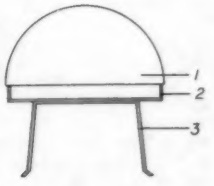
COOLING TOWER OVERFLOW DRAIN CAP

Paul J. DeCanio, 49 Greis Ave., LK Ronkonkoma, N.Y. 11779

Filed Jul. 26, 1989, Ser. No. 385,198

Int. Cl.[5] B01F *3/04*

U.S. Cl. 55—385.1 **2 Claims**



1. Cooling tower overflow drain cap which comprises:

(A) a cap which prevents condenser carryover and makeup spray loss down the overflow drain, and

(B) a stop member which holds the cap at a proper distance from the overflow drain permitting overflowing condenser water down the overflow drain, and

(C) retention leg members which when removably installed in the overflow drain holds the device in place for desired results, and

(D) a cap which has a larger diameter than the drain pipe, shaped as a half hollow sphere, which can fit various size drain pipes, and

(E) a stop member which is connected to the cap, which the bottom surface of the stop member makes contact with the top edge of the drain pipe, means for support of the cap bottom edge above the upper edge of the drain pipe, and means for stopping the movement of the cap in a downward direction, which can fit various size drain pipes, and

(F) retention leg members which are connected to the bottom surface of the stop member, which each leg member angle outwardly from the bottom surface of the stop member, which at the bottom of the retention leg members have an angle protruding out, which edge conforms to the inner surface of the drain pipe, means for keeping the cap centric to the drain pipe, and means for holding the cap in the inverted position with the stop member bottom surface flush against the top edge of the drain pipe, which does not permit movement, which can fit various size drain pipes.

4,927,440

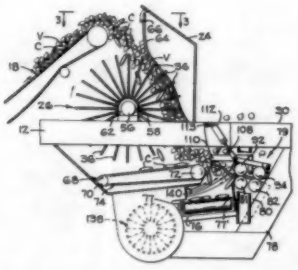
THRASHING SYSTEM FOR VEGETABLE HARVESTERS

Lee D. Butler, Kingsburg; Franklin P. Orlando, Morgan Hill, and Don H. Lenker, Salinas, all of Calif., assignors to FMC Corporation, Chicago, Ill.

Filed Dec. 23, 1988, Ser. No. 288,838

Int. Cl.[5] A01D *45/00*

U.S. Cl. 56—12.8 **20 Claims**



1. An apparatus for harvesting fruit attached to vines growing in the ground, comprising:

means for moving a mobile harvester through the vines;

means for elevating the vines and attached fruit from the ground;

means defining an oscillating shaker head including a tubular shaft having a plurality of tines thereon, a pair of eccentric weights connected to said tubular shaft, first drive means for oscillating said eccentric weighs, and second drive means connected to said tubular shaft for allowing the tubular shaft to oscillate while positively driving the shaker head in a desired direction;

means for releasing the vines and attached fruit onto tines of said oscillating shaker head for shaking a major portion of the fruit free from the vines while the shaker head is driven in a predetermined direction;

means for directing a blast of high pressure air against the vines and separate fruit for lifting and separating the vines for releasing the fruit therefrom;

means for collecting the fruit; and

means for discharging the vines from the harvester.

15. A method of harvesting fruit attached to vines growing in the ground, comprising the steps of:

moving a mobile harvester through the vines;

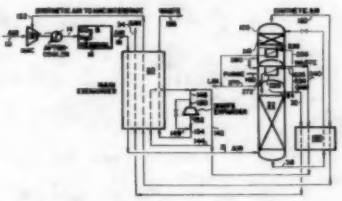
elevating the vines and attached fruit;
releasing the vines and attached fruit on tines of an associated shaker head for shaking a majority of the fruit free from the vines while rotating in a predetermined direction;
continuously oscillating the tines while harvesting the fruit;
driving the portions of the tines in contact with the vines and fruit in a direction rearwardly of the direction of movement of the mobile harvester;
directing the vines and fruit into at least one pair of pinch rolls for separating the fruit from the vines and for gripping and pulling the vines out of the harvester for discharge on the ground;
directing a blast of high pressure air against the vines and separate fruit for lifting and separating the vines for releasing the fruit therefrom; and
separately connecting the fruit and discharging the vines from the harvester.

4,927,441

HIGH PRESSURE NITROGEN PRODUCTION CRYOGENIC PROCESS

Rakesh Agrawal, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 27, 1989, Ser. No. 428,377
Int. Cl.[5] F25J *3/02*
U.S. Cl. 62—28 **6 Claims**



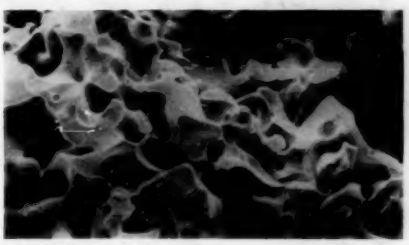
1. In a process for the separation of air by cryogenic distillation wherein a feed air stream is compressed by a multi-staged main air compressor, cooled to near the dew point of the feed air stream and separated into a nitrogen overhead stream and an oxygen-enriched bottoms liquid in a rectifier; at least a portion of the nitrogen overhead is condensed to provide reflux for the rectifier; at least another portion of the nitrogen overhead is removed from the process as gaseous nitrogen product; the oxygen-enriched bottoms liquid is stripped in a distillation zone comprising one or more distillation stages into a synthetic air stream and a second oxygen-enriched liquid; and the synthetic air stream is warmed to recover refrigeration and subsequently recycled to the process; the improvement for producing medium to high pressure gaseous nitrogen product in a more energy efficient manner comprises:
dividing the portion of the nitrogen overhead to be condensed to provide reflux for the rectifier into two substreams, a first nitrogen overhead substream and a second nitrogen overhead substream;
(b) condensing the first nitrogen overhead substream by indirect heat exchange with the second oxygen-enriched liquid thereby producing a first liquid nitrogen stream;
(c) reducing in pressure at least a portion of the second oxygen-enriched liquid to produce a reduced pressure oxygen-enriched liquid stream;
(d) condensing the second nitrogen overhead substream by indirect heat exchange with the reduced pressure oxygen-enriched liquid stream thereby producing a second light nitrogen stream and a gaseous, oxygen-enriched waste stream;
(e) feeding the first and second liquid nitrogen streams to the top of the rectifier to provide reflux; and
(f) expanding and subsequently warming at least a portion of the gaseous, oxygen-enriched waste stream to recover refrigeration for the process.

4,927,442

METHOD OF PRODUCING OPEN-PORE SINTERED GLASS FILTERS AND PRODUCT

Norbert Greulich; Werner Kiefer, and Veronika Rehm, all of Mainz, Fed. Rep. of Germany, assignors to Schott Glaswerke, Fed. Rep. of Germany

Filed Mar. 14, 1989, Ser. No. 323,088
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1986, 3637690
Int. Cl.[5] C03B *19/08*; B32B *3/26*
U.S. Cl. 65—18.1 **32 Claims**



1. Method for the production of open-pored sintered bodies composed of glass, having a large open-pore volume, high flexural tensile strength, predetermined pore sizes and high flow velocities for fluids and gases, by means of sintering a glass-salt mixture followed by washing out the salt, including the steps of:
producing a parent granular material composed of fine grained glass powder, coarse grained salt powder, the salt having a melting point higher than the glass sintering temperature to prevent the salt from combining with the glass material, said salt being soluble in liquids that do not dissolve the glass, and a bonding material, and to the resulting granulated material admixing 5 to 20 weight percent, with respect to said granulated material, of fine grained glass powder, subjecting the resulting mass to a molding procedure to produce a molded body and sintering the body by heating to the sintering temperature of the glass, and afterwards washing out the salt from the sintered glass.

4,927,443

APPARATUS FOR MANUFACTURING CURVED GLASS SHEETS

Seiichiro Honjo; Kazuo Yamada; Yasuhiro Fuchigami, and Tetsuya Mizusugi, all of Osaka, Japan, assignors to Nippon Sheet Glass Company, Ltd., Osaka, Japan

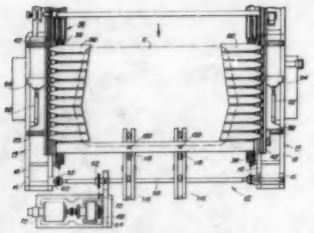
Filed Apr. 8, 1988, Ser. No. 179,569
Claims priority, application Japan, Apr. 8, 1987, 62-86573
Int. Cl.[5] C03B *23/023, 35/20*
U.S. Cl. 65—273 **5 Claims**

1. A system for conveying a heated glass sheet and transferring the heated glass sheet to a mold means, comprising:
a frame;
guide means supported on said frame, said guide means including a pair of fixed inner rails extending parallel to one another in a first direction in which the glass sheet is conveyed between a first position and a second position and a pair of outer movable rails, said movable rails extending in said first direction parallel to said pair of fixed rails;
moving means for moving each of said movable rails in a second direction substantially perpendicular to said first direction of conveyance of the glass sheet between an

inner glass sheet supporting position and an outer glass sheet transfer position;

carrier means movably engaged with each rail of said pair of fixed rails and movable along said fixed rails between said first and second positions; and

glass sheet support/transfer means for supporting said glass sheet thereon and transferring the glass sheet to the mold



means, said glass sheet support/transfer means comprising a plurality of pairs of plates respectively supported on said carrier means for movement therewith and respectively engaged with said pair of movable rails for movement therewith in said second direction substantially perpendicular to the first direction, whereby the glass sheet can be conveyed from the first position to the second position and transferred to the mold means.

4,927,444

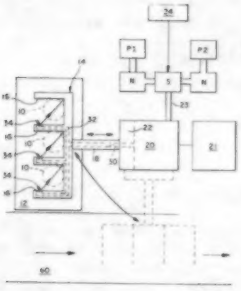
PUSHER MECHANISM FOR GLASS FORMING MACHINE

Gary R. Voisine, Windsor, Conn., assignor to Emhart Industries, Inc., Towson, Md.

Filed Sep. 5, 1989, Ser. No. 402,956

Int. Cl.[5] C03B *35/10*

U.S. Cl. 65—323 **5 Claims**



1. A pusher mechanism for transferring a selected number of containers from a dead plate of a glass forming machine to a conveyor comprising

a container handling arm including a corresponding number of receptacles each having a container engaging corner,

means for displacing said container handling arm from a retracted position to an advanced container receiving position and for displacing said advanced container handling arm from said receiving position through an arc to a deposit position on the conveyor,

a corresponding number of conduit means displaceable with said container handling arm and selectively aimed to direct air discharged therefrom toward the corner of a respective one of said receptacles, and

means for supplying air under pressure to said conduit means when said container handling arm is fully extended for locating each container in its associated corner.

4,927,445

APPARATUS FOR PRODUCING COATED SINGLE TWIST GLASS YARNS

Barbara Soszka, Chambery; Robert Federowsky, Aix-Les-Bains, and Jacques Mahler, Chambery, all of France, assignors to Vetrotex Saint-Gobain, Chambery, France

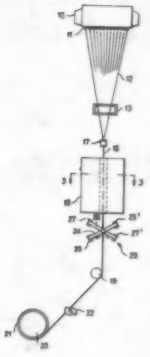
Division of Ser. No. 127,732, Dec. 2, 1987, Pat. No. 4,853,021.

This application Apr. 5, 1989, Ser. No. 334,042

Claims priority, application France, Dec. 4, 1986, 86-16971

Int. Cl.[5] C03C *25/02*; D10H *1/24*; C03B *37/02*

U.S. Cl. 65—11.1 **18 Claims**



1. An apparatus for producing single twist coated glass yarns, said apparatus comprising:

receptacle means for providing a substantially constant stream of molten glass;

means for drawing a plurality of elongated glass fibers from said receptacle means;

first means for applying a curable sizing coating to at least a portion of an outer surface of said fibers, said coating being applied directly after said fibers exit said receptacle means;

means for gathering said coated fibers into a yarn;

means for imparting a continuous, rotative twisting movement to said coated yarn; and

means for curing said sizing coating upon the surface of said yarn.

4,927,446

GLASS MELTING FURNACE

Seiichiro Manabe, and Yukihito Nagashima, both of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Dec. 16, 1988, Ser. No. 285,893

Claims priority, application Japan, Dec. 24, 1987, 62-327892

Int. Cl.[5] C03B *5/033*

U.S. Cl. 65—347 **5 Claims**

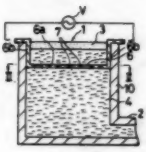
1. A glass melting furnace comprising,

a furnace body having an upper portion and a bottom portion, a material entrance provided at the upper portion of the furnace body,

a molten glass exit provided at the bottom portion of the furnace body, and

a resistance heating element situated in the furnace body between the material entrance and molten glass exit, said resistance heating element extending substantially throughout at least one horizontal level of the furnace body and having openings therein and extending through

said heating element with 5–60% of ration T/S×100(%) wherein T is total area of the openings and S is total area of the resistance heating element so that when the furnace



is used to melt glass, the resistance heating element is immersed in the glass to melt glass around the resistance heating element and allow molten glass to pass through the openings.

4,927,447

SOIL AMENDMENT MATERIAL AND PROCESS FOR PREPARATION THEREOF

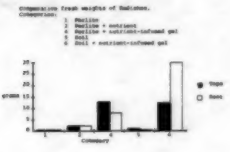
Nabil N. Youssef, 2168 N. 1450 East, North Logan, and Gene W. Miller, 935 S. 400 East, Providence, both of Utah 84321

Continuation of Ser. No. 936,519, Dec. 1, 1986, Pat. No. 4,762,545. This application May 13, 1988, Ser. No. 194,043

The portion of the term of this patent subsequent to Aug. 9, 2006, has been disclaimed.

Int. Cl.[5] C05G *3/04*

U.S. Cl. 71—27 **13 Claims**



1. A method of preparing a plant nutritive soil amendment material, comprising the steps:

providing a quantity of water insoluble hydrophilic polymer in granular form, said polymer being non-toxic to plants to be grown and capable of cross linking in the presence of water to become essentially insoluble and capable of undergoing repeated reversible hydration and dehydration cycles;

providing a quantity of water solution containing at least one plant nutrition containing salt, said solution being of sufficiently dilute concentration that said polymer is capable of said cross linking in its presence to become essentially insoluble and to maintain its capability to undergo repeated reversible hydration and dehydration;

soaking said quantity of polymer in a quantity of said solution, so that said polymer swells to incorporate at least a portion of said solution within its molecular structure;

decanting any remaining unbound solution from the swollen polymer;

heating said polymer to expel the absorbed water therefrom; and

repeating the soaking, decanting and drying steps, until the nutritive content of the polymer reaches a desired level.

4,927,448

THIADIAZABICYCLONONANE DERIVATIVES AND HERBICIDAL COMPOSITIONS

Mikio Yamaguchi; Chiharu Suzuki, both of Shizuoka; Kenji Matsunari, Fujieda; Takeshige Miyazawa, Shizuoka, and Yasuo Nakamura, Tokyo, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of Tokyo, Japan

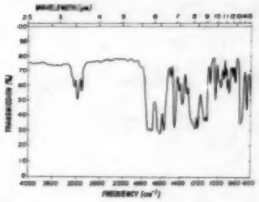
Filed Oct. 14, 1988, Ser. No. 257,805

Claims priority, application Japan, Oct. 16, 1987, 62-260866

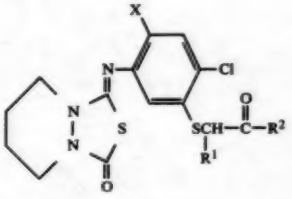
The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.

Int. Cl.[5] C07D *513/04*; A01N *43/82*

U.S. Cl. 71—90 **12 Claims**

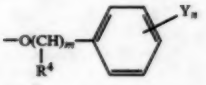


1. A thiadiazabicyclononane derivative having the formula:

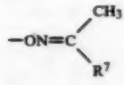


(I)

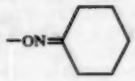
wherein X is hydrogen or halogen, R^1 is hydrogen or lower alkyl, R^2 is lower alkenyloxy, lower alkynyloxy, lower alkythio, halogen-substituted alkoxy lower alkosy, lower alkoxycarbonyl (lower) alkoxy α, α-dimethylbenzylamino, $—OC_2H_4S(O)_lR^3$ (wherein R^3 is alkvl or phenyl, and l is an integer of 0 or 2),



(wherein Y is halogen, lower alkyl, lower alkoxy or nitro, R^4 is hydrogen or lower alkyl, and each of m and n is an integer of 0, 1 or 2), $—OC_2H_4OR^5$ (wherein R^5 is phenyl, benzyl or methoxyalkyl), $—OCH_2R^6$ (wherein R^6 is styryl, cyanoalkyl, tetrahydrofuran-2-yl, thienyl or pyridin-2-yl),



(wherein R^7 is lower alkyl or phenyl) or



4,927,449

TRICYCLIC 1H-IMIDAZOLE-5-CARBOXYLIC ACID DERIVATIVES AS HERBICIDES

William R. Lutz, Riehen, Switzerland; Wim G. Verschueren, Antwerpen, Belgium; Hanspeter Fischer, Bottmingen, Switzerland, and Guy R. E. Van Lommen, Berlaar, Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

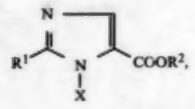
Division of Ser. No. 134,440, Dec. 17, 1987, abandoned. This application Dec. 27, 1988, Ser. No. 289,947

Claims priority, application United Kingdom, Dec. 23, 1986, 8630759

Int. Cl.[5] A01N *43/02, 43/48;* C07D *403/00*

U.S. Cl. 71—90 17 Claims

1. A compound of the formula:



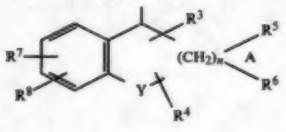
(I)

a stereochemically isomeric form thereof, or a salt thereof, wherein:

R^1 represents hydrogen or mercapto;

R^2 represents hydrogen, C_{1-7}alkyl, C_{3-7}alkenyl, C_{3-7}-alkynl, Cphd 3-7cycloalkyl, C_{1-7}alkyloxy-C_{1-7}alkyl, or arylC_{1-5}alkyl; and

X represents a group of the formula:



wherein:

Y represents O or S(O) wherein m represents zero, one, or two;

n represents 1, 2, or 3;

A represents C_{1-5}alkanediyl or C_{3-7}cycloalkanediyl;

R^3, R^4, R^5, and R^6each independently represent hydrogen, C_{1-5}alkyl, mono- and di(aryl)C_{1-5}alkyl, C_{1-5}alkloxy, halo, C_{3-7}alkenyl, C_{1-5}alkyl substituted with one to three halo atoms, C_{1-5}alkyloxy substituted with one to three halo atoms, or aryl;

wherein the groups R^3, R^4, and the bivalent group A as defined above may be substituted on any carbon atom making up the Y-containing part of the tricyclic ring system, including any of the CH_2 moieties of the $-(CH_2)_n-$ and Y fragments; provided that the bivalent group A is not connected to the same carbon atom thus forming a spirocyclic ring system; and

R^7 and R^8 each independently represent hydrogen, C_{1-5}alkyl, C_{1-5}alkyloxy, halo, C_{1-5}alkyl substituted with one to three halo atoms, C_{1-5}alkyloxy substituted with one to three halo atoms, cyano, nitro, amino, mono- and di(C_{1-5}alkyl)amino, or C_{1-5}alkyl-carbonylamino; and

wherein aryl represents phenyl optionally substituted with up to three substituents each independently selected from C_{1-5}alkyl, C_{1-5}alkyloxy, and halo.

9. A method for controlling weeds, which method comprises applying to said weeds or to the locus thereof of a herbiacidally effective amount of a chemical compound having the formula (I) as claimed in claim 1.

4,927,450

N-HETEROCYCLOSULFONYL-N'-PYRIMIDINYLUREAS

Werner Föry, and Willy Meyer, both of Riehen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 13, 1987, Ser. No. 120,043

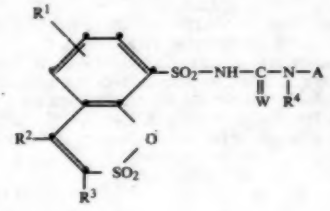
Claims priority, application Switzerland, Nov. 28, 1986, 4770/86

The portion of the term of this patent subsequent to Jul. 26, 2005, has been disclaimed.

Int. Cl.[5] A01N *43/54, 43/32;* C07D *411/12, 403/12*

U.S. Cl. 71—91 11 Claims

1. An N-(2,2-dioxo-1,2-benzoxathiin-8-ylsulfonyl)N'-primidinylurea of formula I



(I)

wherein

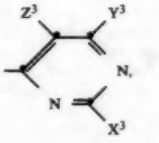
R^1 is hydrogen, halogen, nitro, C_1–C_4alkyl, C_1–C_4haloalkyl, C_1–C_4alkoxy, C_1–C_4haloalkoxy, C_1–C_4alkoxycarbonyl, C_1–C_4alkylthio, C_1–C_4alkylsulfinyl, C_1–C_4alkylsulfonyl or C_2–C_5alkoxyalkoxy,

R^2 and R^3 are each independently of the other hydrogen or C_1–C_4alkyl,

R^4 is hydrogen, methyl or ethyl,

W is oxygen or sulfur, and

A is



A3

wherein

X^3 is halogen, C_1–C_4haloalkoxy, C_1–C_4haloalkyl, C_1–C_4alkoxy, C_1–C_4alkyl, dimethylamino, methylamino, ethylamino, amino or C_2–C_4alkoxyalkyl,

Y^3 is methyl, methoxy, ethyl, ethoxy, C_1–C_2haloalkyl, C_1–C_2haloalkoxy, dimethylamino or methylamino,

Z^3 is hydrogen, methyl, ethyl, methoxy, ethoxy, methoxycarbonyl, ethoxycarbonyl, halogen, cyano, nitro, methylthio, methylsulfinyl or methylsulfonyl, or

Z^3 and Y^3 together are a C_2–C_4alkylene bridge or a C_2–C_4alkylene bridge which is interrupted by oxygen,

or a salt thereof.

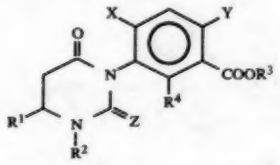
9. A method of controlling undesired plant growth, which method comprises applying to the plants or to the locus thereof an effective amount of a compound of formula I according to claim 1, or of a composition containing such a compound.

4,927,451
3-ARYLDIHYDROURACILS

Walter G. Brouwer, Guelph, Ontario; Ethel Ellen Felauer, Puslinch, Ontario, both of Canada, and Allyn Roy Bell, Cheshire, Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn. and Uniroyal Chemical Ltd/Ltee, Don Mills, Canada

Filed Dec. 30, 1988, Ser. No. 292,088
Int. Cl.[5] A01N *43/54*; C07D *239/22*
U.S. Cl. 71—92 **9 Claims**

1. A compound having the structural formula



where R^1 is hydrogen, C_1–C_4 alkyl, C_3–C_6 cycloalkyl, C_3–C_4 alkenyl or trifluoroethyl; R^2 is C_1–C_4 alkyl, C_3–C_6 cycloalkyl, C_3–C_4 alkenyl, C_7–C_{10} aralkyl or C_7–C_{10} haloaralkyl; R^3 is hydrogen or C_1–C_4 alkyl; R^4 is hydrogen or C_1–C_2 alkyl; X is halogen; Y is hydrogen; C_1–C_4 alkyl or halogen; and Z is oxygen or sulfur.

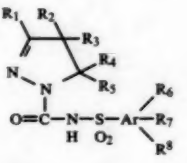
7. A method for controlling weeds comprising applying a herbicidally effective amount of the compound of claim 1 to the locus to be protected.

4,927,452
1-CARBONYL-2-PYRAZOLINE DERIVATIVES HAVING HERBICIDAL ACTIVITY

Kobus Wellinga, and Jacobus H. H. Eussen, both of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Continuation of Ser. No. 113,659, Oct. 28, 1987, abandoned. This application Nov. 28, 1988, Ser. No. 277,529
Claims priority, application Netherlands, Oct. 31, 1986, 8602746
Int. Cl.[5] A01N *43/56*; C07D *231/06, 231/08*
U.S. Cl. 71—92 **10 Claims**

1. A composition having herbicidal and/or plant growth regulating activity, comprising a herbicidal and/or plant growth regulating amount of an active substance in addition to a solid or liquid inert carrier material, characterized in that the active substance is a compound of the general formula:



(I)

wherein

R_1, R_2, R_3 and R_4 are equal or different and represent hydrogen atoms, alkyl groups having 1–6 carbon atoms, cycloalkyl groups having 3–6 carbon atoms or alkoxycarbonyl groups having 2–5 atoms;

R_5 is a hydrogen atom, an alkyl group or haloalkyl group having 1–8 carbon atoms, an unsubstituted phenyl group or a phenyl group substituted with halogen, nitro, C_1–C_4 haloalkyl, C_1–C_4 alkoxy or C_1–C_4 haloalkoxy, a heterocyclic group selected from the group consisting of furyl and thienyl, which heterocyclic group is unsubstituted or substituted with halogen, nitro, C_1–C_4 haloalkyl, C_1–C_4 alkoxy or C_1–C_4 haloalkoxy, or an alkenyl, alkynyl or alkoxycarbonyl group having 2–5 carbon atoms;

or wherein R_1 together with R_2 or R_3 together with R_4 may form a straight or branched alkylene group having 3–5 carbon atoms;

Ar is a phenyl group, a phenyl (C_1–C_4) alkyl group, a thienyl group or a pyrazolyl group;

R_6 is a hydrogen atom or a substituent on Ar, which substituent, in case Ar is a phenyl or phenylalkyl group, is attached to the phenyl group in the ortho position with respect to the sulphonyl or sulphonylalkyl group, and which substituent is selected from the following atoms and groups: a halogen atom; a nitro group; an alkoxycarbonyl group that has 2–8 carbon atoms and is unsubstituted or substituted with one or more hydroxy or C_1–C_4 alkoxy groups; and an alkyl, hydroxyalkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio, haloalkylthio, alkylsulphonyl and haloalkylsulphonyl group having 1–6 carbon atoms;

R_7 is a hydrogen atom, a halogen atom or a C_1–C_4 alkyl group; and

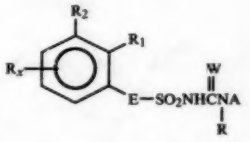
R_8 is a hydrogen atom, a halogen atom or a C_1–C_4 alkyl group; or a salt of this compound with an inorganic o organic base.

4,927,453
HERBICIDAL SULFONAMIDES

Stephen K. Gee, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 85,852, Aug. 17, 1987, abandoned, which is a continuation of Ser. No. 920,051, Oct. 17, 1986, abandoned. This application Aug. 30, 1988, Ser. No. 238,108
Int. Cl.[5] A01N *43/54*; C07D *239/69*
U.S. Cl. 71—92 **24 Claims**

1. A compound selected from



I

wherein

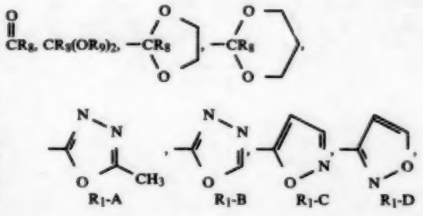
E is CH_2 or a single bond;

W is O or S;

R is H or CH_3;

R_X is H, F, Cl, CH_3, OCH_3, $N(CH_3)_2$ or $OCHF_2$;

R_1 is F, Cl, Br, NO_2, C_1–C_4 alkyl, C_2–C_4 alkenyl, C_2–C_4 haloalkenyl, C_2–C_4 alkynyl, C_1–C_4 haloalkyl, C_1–C_4 alkoxy, $OCH_2CH_2OCH_3$, C_1–C_4 haloalkoxy, C_3–C_4 alkenyloxy, C_2–C_4 haloalkenyloxy, C_3–C_4 alkynyloxy, CO_2R_3, $CONR_4R_5$, $SO_2NR_4'R_5'$, $S(O)_nR_6$, OSO_2R_7, C_1–C_2 alkyl substituted with C_1–C_2 alkoxy, OH or C_1–C_2 alkylthio, CH_2CN, C_6H_5,



R1-A R1-B R1-C R1-D

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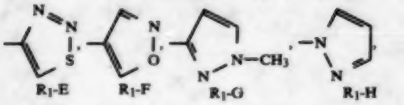
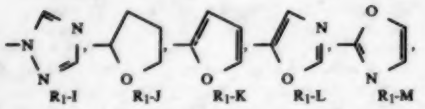
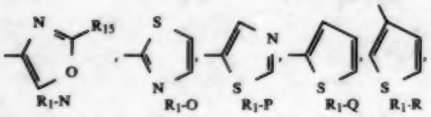
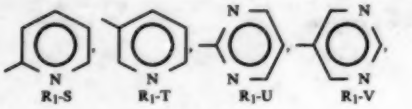
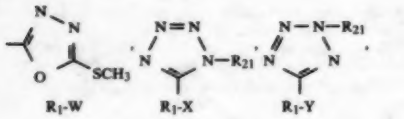
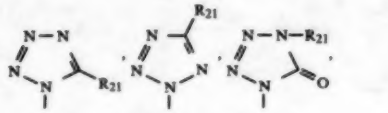


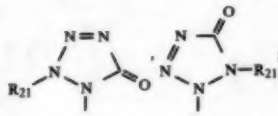




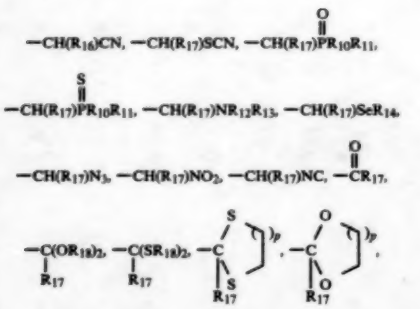








R_2 is



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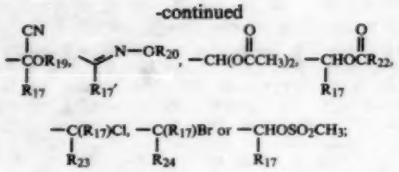
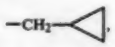


R_3 is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 or alkynyl,



CH_2CH_2Cl, CH_2CH_2F, C_1–C_2 alkyl substituted with OCH_3, SCH_3 or CN;

R_4 is C_1–C_3 alkyl or C_1–C_2 alkoxy;

R_4' is C_1–C_3 alkyl or C_1–C_2 alkoxy;

R_5 is H or C_1–C_3 alkyl;

R_5' is H or C_1–C_3 alkyl;

R_4 and R_5 may be taken together to form $-(CH_2)_3-$ or $-(CH_2)_4-$;

R_4' and R_5' may be taken together to form $-(CH_2)_3-$ or $-(CH_2)_4-$;

R_6 is C_1–C_3 alkyl, $-CH_2CH{=}CH_2$ or $CH_2C{\equiv}CH$;

R_7 is C_1–C_3 alkyl or $N(CH_3)_2$;

R_8 is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CH_2CH_2Cl, CH_2CH_2F, C_1–C_2 alkyl substituted with OCH_3 or SCH_3 or C_3–C_6 cycloalkyl;

R_9 is C_1–C_2 alkyl;

R_{10} and R_{11} are independently C_1–C_2 alkyl, C_1–C_2 alkoxy, C_1–C_2 alkylthio, $NHCH_3$ or $N(CH_3)_2$;

R_{12} and R_{13} are independently H or C_1–C_2 alkyl;

R_{14} is C_1–C_3 alkyl;

R_{15} is H or CH_3;

R_{16} is H, C_1–C_2 alkyl or F;

R_{17} is H or C_1–C_2 alkyl;

R_{17}' is H, C_1–C_2 alkyl, CN, Cl, OCH_3, SCH_3 or $N(CH_3)_2$;

R_{18} is C_1–C_2 alkyl;

R_{19} is H, $Si(CH_3)_3$ or C_1–C_2 alkyl;

R_{20} is H or C_1–C_2 alkyl;

R_{21} is H, C_1–C_3 alkyl or allyl;

R_{22} is C_1–C_2 alkyl or C_1–C_2 haloalkyl;

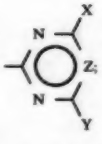
R_{23} is H, CH_3, Cl or Br;

R_{24} is H or CH_3;

p is 1 or 2;

n is 0, 1 or 2;

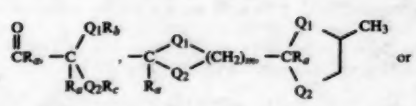
A is



A-1

X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino or di(C_1–C_3 alkyl)amino;

Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylthioalkyl, C_2–C_5 alkylsulfinylalkyl, C_2–C_5 alkylsulfonylalkyl, C_1–C_4 haloalkyl, C_2–C_4 alkynyl, C_3–C_5 cycloalkyl, azido, cyano,



$N(OCH_3)CH_3$;

m is 2 or 3;

Q_1 and Q_2 are independently O or S;

R_a is H or C_1–C_3 alkyl;

R_b and R_c are independently C_1–C_3 alkyl; and

Z is CH, CCH_3, CC_2H_5, CCl or CBr;

and their agriculturally suitable salts; provided that

(1) when X is halogen, then Z is CH and Y is OCH_3, OC_2H_5, NH_2, $NHCH_3$, $N(CH_3)_2$, OCF_2H, OCF_2Br or $N(OCH_3)CH_3$;

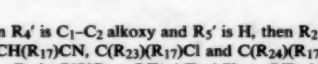
(2) when X or Y is C_1 haloalkoxy, then Z is CH;

(3) when W is S, then R is H, Z is CH and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or

(4) when the total number of carbon atoms of X and Y is greater than four, then the combined number of carbons of R_1 and R_2 is less than or equal to six;

(5) when R_2 is $-C(O)R_{17}$, $-C(R_{23})(R_{17})Cl$ or $-C(R_{24})(R_{17})Br$ then Y is other than cyclopropyl;

(6) when Y is C_2–C_5 alkylthioalkyl, C_2–C_5 alkylsulfinylalkyl or C_2–C_5 alkylsulfonylalkyl, then R_2 is other than $-CH(R_{17})NO_2$,



(7) when R_4' is C_1–C_2 alkoxy and R_5' is H, then R_2 is other than $CH(R_{17})CN$, $C(R_{23})(R_{17})Cl$ and $C(R_{24})(R_{17})Br$;

(8) when R_2 is $C(O)R_{17}$, $C(R_{23})(R_{17})Cl$ or $C(R_{24})(R_{17})Br$, then R_1 is other than C_1–C_4 haloalkyl or C_2 alkyl substituted with C_1–C_2 alkoxy, OH or C_1–C_2 alkylthio;

(9) when R_2 is $C(R_{23})(R_{17})Cl$ or $C(R_{24})(R_{17})Br$, then X and Y are other than C_1–C_4 haloalkoxy or C_1–C_4 haloalkylthio;

(10) when R_2 is $C(R_{23})(R_{17})Cl$ or $C(R_{24})(R_{17})Br$, then R_1 is other than C_1–C_4 haloalkoxy, C_3–C_4 alkenyloxy, C_2–C_4 haloalkenyloxy, C_2–C_4 alkynyl, C_3–C_4 alkynyloxy, C_2–C_4 haloalkenyl and R_1—A through R_1—W;

(11) when R_1 is R_1—X, R_1—Y, R_1—Z, R_1—AA, R_1—AB, R_1—AC or R_1—AD, then R_2 is other than $CH(R_{16})CN$, $C(R_{23})$—$(R_{17})Cl$ and $C(R_{24})(R_{17})Br$;

(12) when R_2 is $C(O)R_{17}$, then R_1 is other than $SO_2NR_4'R_5'$; and

(13) when R_2 is CO_2R_3, then both R_{12} and R_{13} are other than H.

4,927,454

SUBSTITUTED 1-BENZYLSULPHONYL-3-HETEROARYL-(THIO)UREA HERBICIDES

Christa Fest, Wuppertal; Klaus-Helmut Müller, Duesseldorf; Theodor Pfister, Monheim; Hans-Jochem Riebel, Wuppertal; Ernst Kysela, Bergisch-Gladbach; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch-Gladbach, and Robert H. Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

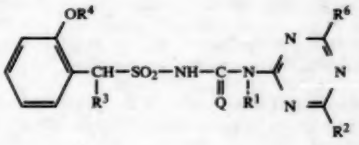
Division of Ser. No. 130,772, Dec. 9, 1987, Pat. No. 4,806,147. This application Nov. 8, 1988, Ser. No. 268,419

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1986, 3642824

Int. Cl.[5] **A01N** *43/66;* **C07D** *251/42, 251/48, 251/70*

U.S. Cl. 71—93 **4 Claims**

1. A substituted 1-benzylsulphonyl-3-triazinyl(thio)urea of the formula



in which

Q represents oxygen or sulphur,

R^1 represents hydrogen, or represents C_1–C_6-alkyl (which is optionally substituted by fluorine, cyano, C_1–C_4-alkoxy or C_1–C_4-alkylthio), or represents C_3–C_6-alkenyl or C_3–C_6-alkynyl (which are optionally substituted by fluorine or chlorine), or represents phenyl-C_1–C_2-alkyl (which is optionally substituted in the phenyl part by fluorine, chlorine, nitro, cyano, methyl, methoxy or C_1–C_2-alkoxycarbonyl),

R^2 represents hydrogen, fluorine, chlorine, bromine, methyl, ethyl, trifluoromethyl, methoxy, ethoxy, difluoromethoxy, methylthio, ethylthio, amino, methylamino, ethylamino, dimethylamino or diethylamino,

R^3 represents hydrogen or C_1–C_4-alkyl,

R^4 represents halogeno-C_1–C_4-alkyl wherein halogen represents fluorine and/or chlorine, and

R^6 represents hydrogen, fluorine, chlorine, bromine, methyl, ethyl, trifluoromomethyl, methoxy, ethoxy, propoxy, isopropoxy, difluoromethoxy, methylthio, ethylthio, methylamino, ethylamino, dimethylamino or diethylamino,

or a salt thereof with a metal or basic organic nitrogen compound.

3. A herbicidal composition comprising a herbicidally effective amount of a compound or salt thereof according to claim 1 and a diluent.

4,927,455

PLANT GROWTH MEDIUM

Saburo Hotta; Yoshiaki Kikuchi, both of Yokohama; Masanori Takaya, Tokyo, and Takashi Inoue, Yokohama, all of Japan, assignors to Kyodo Shiryo Co., Ltd., Kanagawa, Japan

Filed Sep. 1, 1987, Ser. No. 91,864

Claims priority, application Japan, Sep. 12, 1986, 61-215087; Jan. 14, 1987, 62-5035; Jun. 9, 1987, 62-142233

Int. Cl.[5] **C05G** *3/04;* **C09K** *17/00*

U.S. Cl. 71—64.13 **6 Claims**

1. Plant growth medium obtained by a process comprising a gel-formable material and water-holding material with a conventional powdery plant culture medium, forming the resultant mixture, and then drying and solidifying the thus-formed mixture by vacuum freeze drying, the water-holding material being selected from the group consisting of vermiculite, perlite, zeolite, cellulose materials, water-holding fibrous materi-

als, ceramic raw materials and rock wool, and the gel-formable material being selected from the group consisting of agar, carrageenan, gelatin, pullulan of bacterial origin and montmorillonite.

4,927,456

HYDROMETALLURGICAL PROCESS FOR PRODUCING FINELY DIVIDED IRON BASED POWDERS

Nelson E. Kopatz, Sayre; Walter A. Johnson, and Joseph E. Ritsko, both of Towanda, all of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed May 27, 1987, Ser. No. 54,479

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.[5] B22F 1/00, 9/24

U.S. Cl. 75—346 13 Claims

1. A process consisting essentially of:

(a) forming an aqueous solution containing at least one iron group metal value,

(b) forming a reducible solid metallic material selected from the group consisting of iron group metal salts, oxides, hydroxides and mixtures thereof from said solution,

(c) reducing said material to form iron group based metallic powder particles,

(d) entraining at least a portion of said powder particle in a carrier gas to form entrained iron group metal powder particles,

(e) feeding said entrained particles and said carrier gas into a high temperature zone and maintaining said particles in said zone for a sufficient time to melt at least about 50% by weight of said particles, and to form droplets therefrom and

(f) cooling said droplets to form iron group metal based particles having essentially a spherical shape and a majority of said particles having a size less than 20 micrometers.

4,927,457

METHOD OF MANUFACTURING LOW CARBON FERRO-CHROMIUM

Kazumi Ohta; Sotoaki Kawaguchi; Hisao Doyama, and Yutaka Yano, all of Tokyo, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

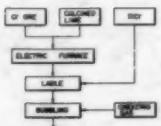
PCT No. PCT/JP88/00085, § 371 Date Sep. 28, 1988, § 102(e) Date Sep. 28, 1988, PCT Pub. No. WO88/05829, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 1, 1988, Ser. No. 272,806

Claims priority, application Japan, Feb. 2, 1987, 62-22156; Feb. 6, 1987, 62-24785

Int. Cl.[5] C22B 4/00

U.S. Cl. 75—10.63 12 Claims



1. A method of manufacturing low carbon ferro-chromium having a low nitrogen level, comprising the steps of:

melting ores including oxides of Cr and Fe in a furnace to form a melt comprising molten slag;

pouring the molten slag into a ladle;

adding a reducing agent to the molten slag in the ladle to reduce oxides of Cr and Fe to form metallic low-carbon ferro-chromium; and

introducing an oxidizing gas or an inert gas other than nitrogen or a nitrogen-containing gas into the melt in the ladle, thereby bubbling the melt and accelerating reduction of said oxides, said gas being introduced into the melt in the ladle at a rate of more than 7.0 l/min. but not exceeding 29.0 l/min., for each ton of the melt in the ladle.

4,927,458

METHOD FOR IMPROVING THE TOUGHNESS OF BRITTLE MATERIALS FABRICATED BY POWDER METALLURGY TECHNIQUES

Martin J. Blackburn, Kensington, and Michael P. Smith, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 1, 1988, Ser. No. 239,720

Int. Cl.[5] B22F 1/00

U.S. Cl. 75—246 4 Claims

1. A method for increasing the toughness of a powder metallurgy brittle material which comprises:

incorporating from about 5% to about 30% by vol. of tough compatible particles having an average diameter of from about 50 to about 300 microns into the matrix,

whereby the toughness of the resultant article exceeds that which would be predicted by a rule of mixture calculation.

4,927,459

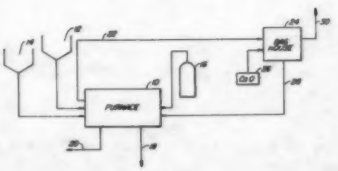
TREATMENT OF ALUMINUM REDUCTION CELL LININGS COMBINED WITH USE IN ALUMINUM SCRAP RECLAMATION

Owen M. Gardner, Oakland, Calif., and Ralph L. Cheek, Tulsa, Okla., assignors to Imco Recycling Inc., Dallas, Tex.

Filed Mar. 17, 1989, Ser. No. 324,843

Int. Cl.[5] C22B 7/04

U.S. Cl. 75—685 32 Claims



1. A process for disposing of spent aluminum reduction cell lining material in a manner free of leachable species of such material, said process comprising:

(a) combining said lining material with salt flux materials to form a flux mixture;

(b) contacting aluminum-bearing waste material with said flux mixture in molten form to cause aluminum from said aluminum-bearing waste material to separate into a molten aluminum phase substantially free of species other than metallic aluminum, and to convert substantially all leachable species from said lining material to vapor form, leaving a salt phase containing nonvaporized components of said flux mixture and said species from said aluminum-bearing waste material other than metallic aluminum; and

(c) disposing of said lining material free of said leachable species.

4,927,460

INDUCTION MELTING AND STIRRING

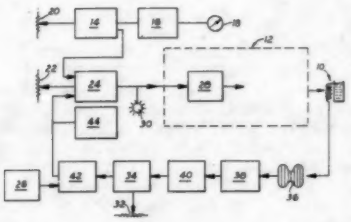
John H. Simcock, Droitwich, United Kingdom, assignor to Inductotherm Europe Limited, Hereford & Worcester, United Kingdom

Division of Ser. No. 144,367, Jan. 15, 1988, Pat. No. 4,850,573. This application Apr. 4, 1989, Ser. No. 333,356

Claims priority, application United Kingdom, Feb. 14, 1987, 8703488

Int. Cl.[5] C21C 7/00

U.S. Cl. 75—10.14 11 Claims



1. A method of inductively stirring molten metal, which comprises the steps of:

(a) inductively heating molten metal in a vessel to a preselected temperature by applying power thereto from a single power supply at a first frequency through an induction coil; and

(b) modulating the amplitude of the power to the induction coil with a modulation signal at a second frequency so that the melt is agitated to a predetermined extent independent of a selected overall power input.

4,927,461

MACHINABLE-GRADE, FERROUS POWDER BLEND CONTAINING BORON NITRIDE AND METHOD THEREOF

Cavit Cilogiu, Tracy; Martin Gagne, St-Pierre de Sorel; Edy Laraque, Tracy; Joel Poirier, Sorel; Sylvain Tremblay, Jonquiere, and Yves Trudel, Tracy, all of Canada, assignors to Quebec Metal Powders, Ltd., Tracy, Canada

Filed Nov. 2, 1988, Ser. No. 266,419

Int. Cl.[5] B22F 1/00

U.S. Cl. 75—254 24 Claims

1. A powder metallurgy blend comprising:

from about 85 to about 99.99 weight percent of a ferrous powder having a maximum particle size of less than about 300 microns; and

from about 0.01 to about 0 5 weight percent boron nitride powder comprising irregularly-shaped submicron particles of about 1 micron or less.

4,927,462

OXIDATION OF CARBON FIBER SURFACES FOR USE AS REINFORCEMENT IN HIGH-TEMPERATURE CEMENTITIOUS MATERIAL SYSTEMS

Toshifumi Sugama, Mastic Beach, N.Y., assignor to Associated Universities, Inc., Washington, D.C.

Filed Dec. 23, 1988, Ser. No. 288,962

Int. Cl.[5] C04B 7/02

U.S. Cl. 106—99 4 Claims

1. In a Portland cementitious material system suitable for use in geothermal wells which contains a carbon fiber-reinforced cement, an improvement which comprises pre-treating said carbon fiber with a sodium hydroxide solution as an oxidizing agent so that said fiber has an oxidized fiber surface.

4,927,463

AQUEOUS DISPERSION OF GYPSUM AND ITS USE AS A FILLER AND COATING PIGMENT IN THE PRODUCTION OF PAPER AND CARDBOARD

Erhard Kloetzer, Putzbrunn; Johannes Kioustelidis, Ladenburg, and Guenter Schmidt, Dannstadt-Schauernheim, all of Fed. Rep. of Germany, assignors to Biochemie Ladenburg GmbH, Ladenburg, Fed. Rep. of Germany

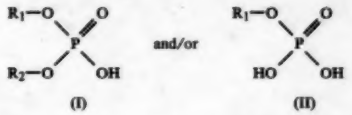
Filed Mar. 30, 1989, Ser. No. 330,815

Claims priority, application Fed. Rep. of Germany, Apr. 8, 1988, 3811763

Int. Cl.[5] C04B 11/00, 24/00; C01F 11/46

U.S. Cl. 106—109 24 Claims

1. An aqueous dispersion comprising gypsum and a surface-active, anionic compound, wherein said surface-active compound is a phosphoric acid ester selected from the group consisting of (1) an acidic phosphoric acid ester of the formula:



(I) (II)

wherein R1 and R2 are the same or different and are alkyl poly(oxyethylene), alkyl poly(oxypropylene), alkylphenoxyalkyl or alkylphenyl polyoxyalkyl radicals, (2) a monophosphoric acid ester of a monoor dihydroxyalkylurea or of an alkoxylated mono- or dihydroxyalkylurea, and (3) a phosphoric acid ester of a poly-alkoxylated amine, in which one or more hydroxyl groups are are be esterified with phosphoric acid.

4,927,464

PARTICULATE MATERIAL

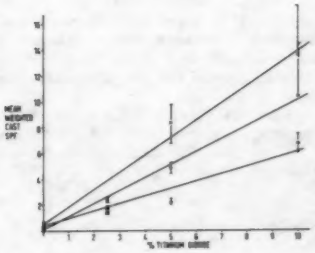
Alan G. Cowie, Stockton on Tees, England, assignor to Tioxide Group PLC, London, United Kingdom

Filed May 23, 1988, Ser. No. 197,169

Claims priority, application United Kingdom, May 30, 1987, 8712752

Int. Cl.[5] C09C 1/36

U.S. Cl. 106—436 17 Claims



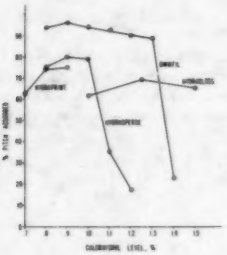
1. Particulate material comprising non-calcined titanium dioxide the particles of which are acicular in shape and which have a ratio of the longest dimension to the shortest dimension within the range of 8:1 to 2:1 and wherein the largest dimension is within the range 0.01 to 0.15 micron and said particles having a coating comprising an oxide or hydrous oxide of aluminum and an oxide or hydrous oxide of silicon in a weight ratio of Al_2O_3:SiO_2 of at least 1.5 and not greater than 4.5 and said material being substantially transparent to visible light and substantially absorbant to UV light.

4,927,465

KAOLIN CLAYS FOR PITCH CONTROL

Walter J. Hyder, Lizella; Albert C. Kunkle, and Robert M. Weaver, both of Macon, all of Ga., assignors to J. M. Huber Corporation, Rumson

Filed Oct. 19, 1987, Ser. No. 109,881
Int. Cl.[5] C09C *1/42*
U.S. Cl. 106—486 **6 Claims**



1. Kaolin clay chemically modified to have improved pitch adsorption by reaction with a double bond hydroxide of magnesium and aluminum, said kaolin clay having been beneficiated prior to said chemical modification.

4,927,466

TRANSPARENT, HIGH STRENGTH ORGANIC PIGMENTS AND PROCESS FOR MAKING SAME

Byron G. Hays, Verona, N.J., assignor to BASF Corp., Parsippany, N.J.

Filed Jul. 7, 1989, Ser. No. 376,618
Int. Cl.[5] C08K *5/00*
U.S. Cl. 106—494 **22 Claims**

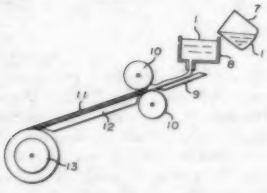
1. A high strength, substantially transparent pigment product, the product comprising at least one pigment selected from the group consisting of disazo pigments and monoazo pigments wherein the pigment particles have a mean ultimate diameter of between about 0.010 micron and about 0.040 micron.

4,927,467

METHOD FOR PRODUCING THIN PLATE OF PHOSPHOR BRONZE

Takaji Kusakawa, 19-9, Saginomiya 1-chome, Nakano-ku, Tokyo; Katsuyoshi Wakamoto, Sagamihara, and Mitsuyuki Imaizumi, Amagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha and Takaji Kusakawa, both of Tokyo, Japan

Filed Feb. 10, 1988, Ser. No. 154,330
Claims priority, application Japan, Feb. 10, 1987, 62-29225
Int. Cl.[5] C22F *1/08*
U.S. Cl. 148—3 **6 Claims**



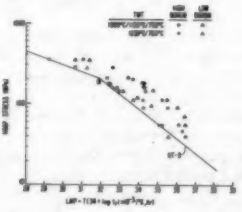
1. A method for continuous manufacture of thin plate ingot of phosphor bronze composed of 0.1 to 9.0% by weight of Sn, 0.03 to 0.35% by weight of P, and the balance being Cu and unavoidable impurities, by quenching molten metal of bronze, which comprises the steps of: quenching said molten metal at a cooling rate in a range of from 10^2 °C./sec. to 10^5°C./sec. to thereby solidify the molten metal; and continuously cooling said solidified metal to a normal temperature to thereby obtain a microstructure having a crystal grain size of 50 μm or below and in which appearance of the dendritic structure and the segregation layer is suppressed.

4,927,468

PROCESS FOR MAKING A MARTENSITIC STEEL ALLOY FUEL CLADDING PRODUCT

Gerald D. Johnson; Ralph J. Lobsinger, both of Kennewick; Margaret L. Hamilton, Richland, and David S. Gelles, West Richland, all of Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 30, 1988, Ser. No. 278,068
Int. Cl.[5] C21D *9/00*
U.S. Cl. 148—3 **1 Claim**



1. A process for making a martensitic steel alloy fuel cladding product for liquid metal cooled reactors, said process comprising the steps of:

preparing and alloy consisting essentially of 9.6–11.6 wt.% chromium, 1.4–1.6 wt.% molybdenum, 0.75–0.95 wt.% manganese, 0.15–0.25 wt.% niobium, 0.3–0.45 wt.% silicon, 0.15–0.25 wt.% carbon, 0.15–0.25 wt.% vanadium, 0.05 maximum wt.% nickel, 0.01–0.02 wt.% nitrogen, 0.01–0.02 wt.% sulfur, 0.03–0.07 wt.% copper, 0.004–0.010 wt.% boron, 0.005–0.010 wt.% phosphorous, and the with remainder being essentially iron;

homogenizing said alloy at about 1000° C. for 16 hours;

annealing said homogenized alloy at 1150° C. for 15 minutes; and

tempering said annealed alloy at 700° C. for 2 hours.

4,927,469

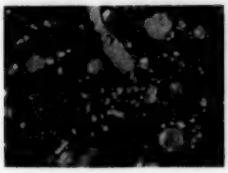
ALLOY TOUGHENING METHOD

Roberto J. Rioja, and Diana K. Denzer, both of Lower Burrell, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation of Ser. No. 860,546, May 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 735,567, May 17, 1985, abandoned. This application Apr. 11, 1988, Ser. No. 180,623
Int. Cl.[5] C22F *1/04*
U.S. Cl. 148—11.5 A **50 Claims**

1. A method of treating a metallurgical object containing metastable, crystalline, featureless regions adversely affecting toughness, comprising heating the object for transforming the

regions at least sufficiently out of their metastable state to stabilize them and make them deformable, and deforming the



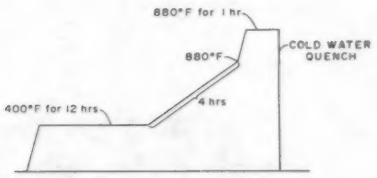
object following the heating to improve toughness as compared to that achieved without the heating.

4,927,470

THIN GAUGE ALUMINUM PLATE PRODUCT BY ISOTHERMAL TREATMENT AND RAMP ANNEAL

Alex Cho, Richmond, Va., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 12, 1988, Ser. No. 256,840
Int. Cl.[5] C22F *1/04*
U.S. Cl. 148—12.7 A **60 Claims**



1. A method of producing an unrecrystallized aluminum base, wrought alloy product having improved levels of strength and fracture toughness, the method comprising the steps of:

(a) providing a body of an aluminum base heat treatable alloy;

(b) working the body to a wrought product;

(c) subjecting said product to a soak;

(d) then subjecting said product to a ramp anneal wherein the annealing temperature is increased during time of anneal; and

(e) solution heat treating, quenching and aging said product to provide a substantially unrecrystallized wrought product having improved levels of strength and fracture toughness.

4,927,471

SEMICONDUCTOR SUBSTRATE COMPRISING WAFER SUBSTRATE AND COMPOUND SEMICONDUCTOR LAYER

Hiroshi Okuda, Atsugi, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Feb. 28, 1989, Ser. No. 316,633
Claims priority, application Japan, Mar. 1, 1988, 63-45820
Int. Cl.[5] H01L *21/20*
U.S. Cl. 148—33.5 **9 Claims**

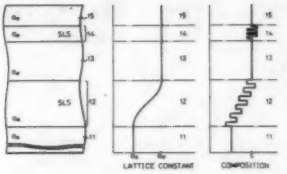
1. A semiconductor substrate including a top epitaxial semiconductor layer comprising:

a single-crystalline semiconductor wafer substrate;

a strained layer superlattice structure layer having a lattice constant varying from that of said wafer substrate to that of said top semiconductor layer and formed on said wafer substrate;

a compound semiconductor buffer layer having the same lattice constant as that of said top semiconductor layer and formed on said strained layer superlattice structure layer;

another strained layer superlattice structure layer for filtering dislocations having a fixed lattice constant equal to



that of said top semiconductor layer and formed on said buffer layer; and

the top semiconductor layer formed on said another strained layer superlattice structure layer.

4,927,472

CONVERSION COATING SOLUTION FOR TREATING METAL SURFACES

Yasunobu Matsushima; Shigeo Tanaka; Tomoyuki Aoki, all of Kanagawa, and Yohji Ono, Tokyo, all of Japan, assignors to Nihon Parkerizing Co., Ltd., Tokyo, Japan

Filed Oct. 13, 1988, Ser. No. 256,935
Claims priority, application Japan, Oct. 13, 1987, 62-257678
Int. Cl.[5] C23C *22/14, 22/23*
U.S. Cl. 148—261 **12 Claims**

1. An aqueous solution for depositing a coating consisting predominantly of tin phosphate on an active metal surface in contact with said solution, comprising:

(a) from about 1 to about 50 grams per liter of orthophosphate ions;

(b) from about 0.2 to about 20 grams per liter of chlorate and bromate ions combined;

(c) a pH of about 2 to about 6;

(d) a total concentration of simple and chelated tin cations, measured stoichiometrically as tin only, of from about 0.01 to about 5.0 grams per liter; and

(e) a concentration of condensed total phosphoric acid and ions derived therefrom, emasured stoichiometrically as maximally neutralized ions, of from about 0.01 to about 5 grams per liter, said condensed phosphoric acid having the general formula $H_{(n+2)}P_nO_{(3n+1)}$, wherein n=2, 3, or 4, said concentration of condensed total phosphoric acid and anions derived therefrom being effective to stabilize the soluble tin content of said solution against spontaneous diminution during storage out of contact with reactive surfaces for a period of one day.

4,927,473

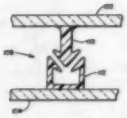
COMPRESSED MAGNETIC POWDER CORE

Kumi Ochiai, Yokohama; Hiromichi Horie, Yokosuka; Itsuo Arima, Kawasaki, and Mikio Morita, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 97,402, Sep. 14, 1987, abandoned, which is a continuation of Ser. No. 780,303, Sep. 26, 1985, abandoned.
This application Oct. 20, 1988, Ser. No. 260,314
Claims priority, application Japan, Sep. 29, 1984, 59-204870; Dec. 27, 1984, 59-274096
Int. Cl.[5] H01F *1/04*
U.S. Cl. 148—306 **7 Claims**

1. A compressed magnetic powder core comprising a compressed body of an iron-based metallic magnetic powder each particle surface of which has been covered with an insulating layer comprising an insulating material selected from the

group consisting of a first inorganic compound powder having an electronegativity of not less than 12.5 selected from the group consisting of thallium oxide, bismuth oxide, manganese dioxide, boron trioxide, arsenic oxide, germanium oxide, tin oxide, tantalum oxide, niobium oxide, vanadium oxide, titanium dioxide, zirconium dioxide, molybdenum, oxide, silicon nitride, titanium nitride, boron nitride, silicon carbide, titanium carbide and a mixture thereof, and a second inorganic compound powder having an electronegativity of less than 8.5 selected from the group consisting of magnesium oxide, yttrium oxide, europium oxide, neodymium oxide, thulium oxide, dysprosium oxide, lanthanum oxide, cobalt oxide, nickel oxide and a mixture thereof, each particle of said first and second inorganic compound powder having a size not exceeding 5 μm, and wherein the magnetic powder has an average particle size of not less than 10 μm and not more than 300 μm.



4,927,474

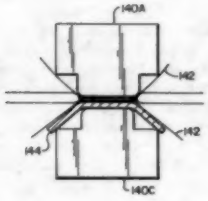
PROCESS AND APPARATUS FOR SEALING THERMOPLASTIC PLIES IN LAMINATED SHEETS HAVING THICKENED SECTIONS

James C. Pawloski, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 11, 1988, Ser. No. 230,940

Int. Cl.[5] B32B *31/20*

U.S. Cl. 156—66 **10 Claims**



1. A process for sealing plies of thermoplastic material included in laminated sheets having thickened sections resulting from the presence of zipper closures, said process comprising the steps of:

(a) performing a first blocking operation on said laminated sheets by the application of heat and pressure through a pair of seal bars configured to maintain said laminated sheets substantially planar during said first blocking operation, said bars engaging areas of said sheets to be sealed including zipper closure portions thereof to preliminarily seal said zipper closure portions and preblock the remainder of said areas;

(b) performing a second blocking operation over the previously blocked areas of said laminated sheets by the application of heat and a soft pressure through a pair of seal bars configured to maintain said laminated sheets substantially planar during said second blocking operation to seal the remainder of said areas and secondarily seal said zipper closure portions; and

(c) performing a final cooling blocking operation over the previously blocked areas of said laminated sheets by the pressure application of a pair of cooling bars configured to maintain said laminated sheets substantially planar during said cooling blocking operation.

4,927,475

PROCESS FOR JOINING METALLIC AND CERAMIC MATERIALS

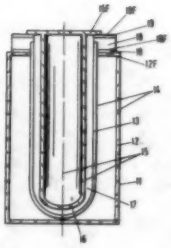
Günther Steinleitner, Schriesheim, and Philipp Roze, Wiesloch-Baiertal, both of Fed. Rep. of Germany, assignors to Asea Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Oct. 31, 1988, Ser. No. 265,147

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736843

Int. Cl.[5] B32B *18/00*

U.S. Cl. 156—89 **2 Claims**



1. A process for joining ceramic to metallic materials which comprises the steps of coating a portion of the ceramic material at the area of the joining surface with a glass coating, juxtaposing the coating portion with the joining area portion of the metallic material to be joined, then consolidating the juxtaposed areas into a joint by the application of a combined pressure and heat treatment:

wherein said glass coating for said ceramic material is selected from the group of glasses having coefficients of thermal expansion with the range of ±10% of the thermal expansion coefficients of said ceramic substrate material and said glass having a transformation point below the heat treatment temperature, said glass for said coating being selected from the group consisting of glasses containing 5 to 20 wt. % of sodium oxide, 30–60 wt. % of boron oxide and 20 to 60 wt. % of silica; said coating being applied to said ceramic substrate at the joining area to a thickness of from 1 to 10 μm; and said temperature and pressure heat-treatment conditions for said ceramic to said metal consolidation are temperatures of at least $0.8 \cdot T_m$ and a pressure of at least 10 Mpa, wherein T_m is the melting point in ° K. of the glass juxtaposed between said ceramic and metallic materials; said heat treatment time being sufficient for consolidation at said joining surfaces of said ceramic and metallic materials by said interposed glass.

4,927,476

METHOD FOR MAKING A REINFORCED THERMOSETTING RESIN STRUCTURE WITH INTEGRAL FLANGED NOZZLE

Richard L. T. Watkins, 1117 E. Beachview Pl., Bellingham, Wash. 98226

Filed Jun. 27, 1988, Ser. No. 212,349
Int. Cl.[5] B32B *31/02*
U.S. Cl. 156—173 80 Claims

1. A method for producing an article of manufacture, comprising the steps of:

(a) providing a primary structure comprising a primary structure wall with an interior surface and an exterior surface, and having a through branch opening defined by a wall edge portion,

(b) providing a branch pipe section having an end edge portion,

(c) providing a mold member comprising

(i) a branch locating portion adapted to be positioned inside said branch pipe section so as to position said branch pipe section,

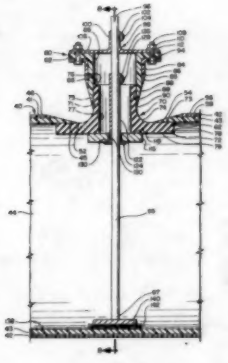
(ii) a flange portion having a locating surface adapted to engage an interior edge surface portion of the interior surface of said primary structure adjacent to said opening;

(iii) a transition portion interconnecting said branch locating portion and said flange portion, said transition portion having an outer forming surface portion,

(d) locating said mold member in an operating position where

(i) said branch locating portion extends outwardly from said through opening, and

(ii) said flange portion fits against said interior edge surface portion,



(e) positioning said branch pipe section around said branch locating portion so as to position said branch pipe section relative to said primary structure,

(f) said transition portion being configured so that with the mold member in said operating position, said outer forming surface is tangentially aligned with an inner edge surface portion of the branch pipe section adjacent to the end edge portion thereof and also tangentially aligned with the interior edge surface portion of said primary structure,

(g) applying a quantity of resin material to said outer forming surface of said mold to form an interconnecting pipe section joining said primary structure and said branch section and providing a transition surface portion blending into the interior edge surface portion of said primary structure and the inner edge surface portion of the branch pipe section, so as to form a finished article,

(h) disengaging said mold member from said interior edge surface portion of said primary structure, and removing said mold member from the finished article.

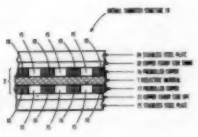
4,927,477

METHOD FOR MAKING A FLUSH SURFACE LAMINATE FOR A MULTILAYER CIRCUIT BOARD

Theron L. Ellis, Vestal, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 769,524, Aug. 26, 1985, abandoned. This application Apr. 15, 1988, Ser. No. 183,462
Int. Cl.[5] B32B *31/26, 31/00;* C09J *5/10*
U.S. Cl. 156—182 5 Claims

1. A method for making a multilayer circuit board having



flush surface laminates with completely flush surfaces, comprising the steps of:

sandwiching a sheet of dielectric material between two sheets of conductive material, each sheet of conductive material having at least one opening extending therethrough between a first surface of the conductive sheet in contact with the dielectric material and a second surface of the conductive sheet forming an outside surface of the sandwich; said dielectric material consisting essentially of an epoxy resin where the thickness of said dielectric material is selected such that a desired spacing is provided between the two sheets of conductive material to produce a characteristic impedance of about 50 ohms;

placing release sheets on the outside surfaces of the sandwich of dielectric and conductive materials;

positioning the sandwich of dielectric and conductive materials with the release sheets on the outside surface between a top plate and a bottom plate which may be used to press the sandwich together while maintaining the sheets of dielectric and conductive material in registration with each other by the use of said openings; and

pressing the sandwich together between the top and the bottom plates at a temperature and pressure sufficient for the dielectric material to flow into the openings in the sheets of conductive material and form a first completely flush surface laminate with the sheets of conductive material;

forming a second completely flush surface laminate in the same manner as the first flush surface laminate;

placing only a layer of dielectric material between the first and the second flush surface laminates; and,

pressing the first and second flush surface laminates together at a temperature and pressure sufficient to form a multilayer laminate;

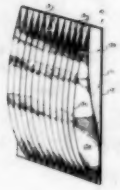
said multilayer laminate having a characteristic impedance of about 50 ohms between said first and second flush surface laminates.

4,927,478

METHOD AND APPARATUS FOR FLETCHING ARROWS

Duane Erickson, 3170 S. 10th East, Salt Lake City, Utah 84106

Filed May 15, 1989, Ser. No. 352,027
Int. Cl.[5] B65H *81/00*; B32B *31/00*
U.S. Cl. 156—185 **8 Claims**



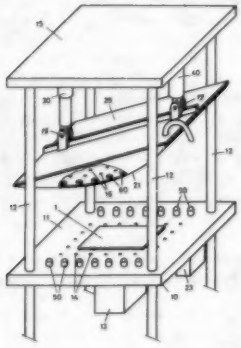
1. A method of fletching arrows comprising the steps of applying elongate fletching guides to be equally spaced around one end of an arrow shaft; and making a fletching extend from each elongate fletching guide.

4,927,479

PROCESS AND PLANT FOR PRESSING FLEXIBLE SHEETS

Josef Böck, Steigrüebli, CH-9400 Rorschacherberg, Switzerland

Continuation of Ser. No. 758,629, Jul. 2, 1985, abandoned. This application Feb. 28, 1989, Ser. No. 318,413
Claims priority, application Switzerland, Nov. 2, 1983, 5926/83
Int. Cl.[5] B29D *9/00*; H01H *11/00*; B32B *31/04*
U.S. Cl. 156—228 **10 Claims**



1. A process for pressure-bonding flexible foils to form a multi-layer composite, comprising:

detachably fastening a first foil layer to a first surface along one side thereof using vacuum pressure;

transferring the first foil layer from the first surface to a second opposed cooperating curved surface including vacuum pressure means using a rolling motion of the second surface over the first surface by reducing the vacuum pressure fastening the first foil layer to the first surface and increasing the vacuum pressure of the second surface simultaneously so that the first foil is detached from the first surface and becomes detachably fastened to the second surface, the first and second surfaces including guide means for cooperating with each other;

detachably fastening a second foil layer to the first surface along one side thereof using vacuum pressure in the same position as the first foil;

rolling the second surface and first foil attached thereto across the first surface while applying uniform contact pressure between the first and second foil layers and engaging the guide means so that a multi-layer composite of the first and second foil layers is formed and simultaneously releasing the second foil layer from the first surface to attach the composite of the first and second foil layers to the second surface; and

removing the composite from the second surface.

5. A device for pressure-bonding flexible foil layers to form flexible composite sheets, comprising:

a frame;

a first vacuum plate having a substantially planar surface for releaseably holding a flexible foil layer on the planar surface mounted on the frame;

a second opposed cooperating vacuum plate having a lower convex surface opposed to the first vacuum plate for releasably holding a flexible foil on the convex surface and being movably mounted on the frame opposite the first plate so that the lower convex surface is rollable across the planar surface of the first plate and applies uniform pressure to the foil layers therebetween;

the first vacuum plate and second vacuum plate cooperating so that the vacuum pressure can be reduced at the same time the vacuum pressure is increased in the second surface when contact pressure between the plates is applied; and

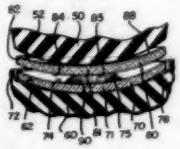
motion control means for imparting a rolling motion of the second plate across the first plate and maintaining uniform contact pressure between the plates and against the foil layers therebetween whereby encapsulation of aid between the foil layers is prevented.

4,927,480

METHOD AND CLAMPING DEVICE FOR BONDING THIN LENS WAFERS

Thomas L. Vaughan, La Jolla, Calif., assignor to Signet Armorlite, Inc., San Marcos, Calif.

Filed Feb. 27, 1989, Ser. No. 315,548
Int. Cl.[5] B29C *65/48*; B32B *1/00*
U.S. Cl. 156—228 **17 Claims**



1. A clamping device for squeezing a quantity of bonding material between a first bonding surface of a first lens wafer and a second bonding surface of a second lens wafer, said first lens wafer comprising a convex outer surface and said second lens wafer comprising a concave outer surface, said clamping device comprising:

a deformable, resilient mold;

said mold comprising a concave surface that is slightly more

planar than said convex outer surface of said first lens wafer;

a deformable, resilient stamp disposed opposite said mold;

said stamp comprising a convex surface that is slightly more curved than said concave outer surface of said second lens wafer; and

piston means for simultaneously exerting pressure on said convex and concave outer surfaces of said lens wafers through said concave surface of said mold and said convex surface of said stamp, respectively, thereby squeezing said quantity of bonding material between said bonding surfaces of said lens wafers.

11. A method for bonding a first lens wafer comprising both a first bonding surface and a convex outer surface to a second lens wafer comprising both a second bonding surface and a concave outer surface, said method comprising the steps of:

applying a quantity of bonding material to a center portion of one of said bonding surfaces;

placing the other of said bonding surfaces in contact with said quantity of bonding material;

providing a deformable, resilient mold comprising a concave surface that is slightly more planar than said convex outer surface of said first lens wafer;

providing a deformable, resilient stamp disposed opposite said mold and comprising a convex surface that is slightly more curved than said concave outer surface of said second lens wafer; and

simultaneously exerting pressure on said convex and concave outer surfaces of said lens wafers through said concave surface of said mold and said convex surface of said stamp, respectively, thereby squeezing said quantity of bonding material between said bonding surfaces of said lens wafers.

4,927,481

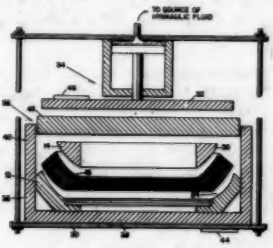
METHOD OF MAKING CONTINUOUS REINFORCEMENT FOR FLEXIBLE BEARING LAMINATE

James D. McGregor, Logan, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Division of Ser. No. 183,568, Apr. 14, 1988. This application Feb. 3, 1989, Ser. No. 306,966

Int. Cl.[5] B29C *43/20*

U.S. Cl. 156—245 **15 Claims**



1. The method of making a flexible bearing that is fabricated of first and second rigid end rings having opposing laminate engaging surfaces with a flexible laminate therebetween consisting of alternate layers of elastomeric material and reinforcement fabric material, impregnated with a resin comprising the steps of:

(a) preparing said reinforcement material in the form of a continuous helical arrangement;

(b) placing said first end ring in the bottom of a mold with the laminate engaging surface thereof facing upwards;

(c) placing said continuous helical arrangement of reinforcement material on the laminate engaging surface of the first end ring, coaxially therewith, with layers of elastomeric material alternating with layers of reinforcement material, to form the laminate;

(d) placing said second end ring in the mold with the laminate engaging surface thereof in engagement with the laminate, coaxially therewith, and with said first ring; and

(e) debulking and curing the assembly.

4,927,482

METHOD AND APPARATUS FOR PRODUCING TREAD STRIPS FOR AUTOMOTIVE VEHICLE TIRES

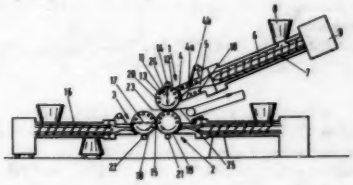
Gerd Capelle, Langenhagen, Fed. Rep. of Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hanover, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,346

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737676

Int. Cl.[5] B29C *47/06*

U.S. Cl. 156—243 **9 Claims**



1. A method of producing profile strips for tread strips, lateral strips, and inner liners, of automotive vehicle tires from a plurality of different rubber components, comprising the steps of:

(a) extruding each of at least two components individually in at least two separate extrusion devices;

(b) passing each said extruded component through a separate extrusion head each associated with one of said at least two extrusion devices to produce a strip of said extruded component;

(c) discharging each said strip through separate nozzle means at the outlet of each of said extrusion heads, each said nozzle means comprising a stationary lip and a movable lip comprising a single rotatable roller around which strip passes;

(d) edge-trimming both lateral edges of each of said strips while said strip is disposed on said associated roller;

(e) disposing said rollers in a roller assembly such that said roller associated with each of said at least two extrusion devices lies closely adjacent the roller associated with another of said at least two extrusion devices to define at least one roller nip therebetween; and

(f) laminating together said individual edge-trimmed strips by passing said strips through said at least one roller nip.

4,927,483

METHOD OF MANUFACTURING A NAIL FILE

David Bray, 2198 Corsair Road, Mississauga, Ontario, Canada (L5A 2L8)

Division of Ser. No. 918,511, Oct. 14, 1986, Pat. No. 4,785,835. This application Nov. 17, 1988, Ser. No. 272,713

Claims priority, application Canada, Nov. 8, 1985, 494963

Int. Cl.[5] B32B *31/14*

U.S. Cl. 156—306.6 **9 Claims**

1. A method of manufacturing a nail polisher and file comprising the steps of:

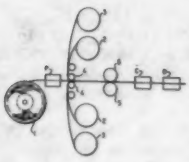
(a) providing a stiff sheet or strip of a base material;

(b) providing at least one source of abrasive substrate, adjacent said base material (a);

(c) providing at least one source of heat activated adhesive film adjacent said substrate and said base material,

whereby said heat activated adhesive film can be drawn with said substrate into contact with said base material, between said base and said substrate;

(d) drawing said substrate and said film into contact with



said base as aforesaid, and applying heat, between 300° F. and 500° F., and pressure, to said base, film and substrate, to laminate said substrate to said base, and thereby form a laminate; and

(e) cutting said laminate into nail files.

4,927,484

REACTIVE ION ETCHING APPARTUS

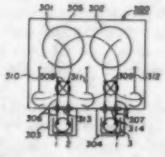
Yoshimichi Mitomi, Wadasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 84,193, Aug. 12, 1987, abandoned. This application Oct. 18, 1988, Ser. No. 259,395

Claims priority, application Japan, Sep. 3, 1986, 61-205854

Int. Cl.[5] H01L *21/02*

U.S. Cl. 156—345 **5 Claims**



1. A reaction ion etching apparatus comprising a buffer room which contains:

a first reactive chamber,

a second reactive chamber placed adjoining said first reactive chamber in a first direction,

a first stage member disposed adjoining said first reactive chamber in a second direction perpendicular to said first direction,

a second stage member disposed adjoining said second reactive chamber in said second direction,

the centers of said first and second reactive chambers and said first and second stage members are respectively at corners of a square;

a first transfer arm positioned and arranged for transferring a wafer from said first stage member to said first reactive chamber,

a second transfer arm positioned and arranged for transferring said wafer among said first and second reactive chambers and said first and second stage members, said second transfer arm having a pivot point at the center of said square so as to be turnable through 360°, and

a third transfer arm positioned and arranged for transferring said wafer from said second reactive chamber to said second stage member;

said first, second and third transfer arm each positioned and arranged for transferring wafers along a path defined by the length of their respective arms wherein all three arms may be moved simultaneously by moving said first transfer arm and said third transfer arm in one of two directions, clockwise or counterclockwise, while moving said second transfer arm in the other of said two directions.

4,927,485

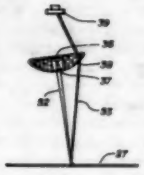
LASER INTERFEROMETER SYSTEM FOR MONITORING AND CONTROLLING IC PROCESSING

David Cheng, San Jose; Robert P. Hartlage, Santa Clara, and Wesley W. Zhang, Burlingame, all of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Filed Jul. 28, 1988, Ser. No. 225,158

Int. Cl.[5] G01B *11/06*; **H01L** *21/306*

U.S. Cl. 156—345 **4 Claims**



1. A laser interferometer system for monitoring the etching of a workpiece, comprising: a laser for providing laser light; and for positioning a workpiece such that laser light from said laser is reflected off of said workpiece; detecting means for detecting laser light reflected from a surface of the workpiece; means for analyzing the detected light to monitor at least one of etch rate, etch depth and etch-through of a selected layer of the workpiece; and, a collector lens mounting the laser within said collector lens; means for mounting said collected lens in said interferometer system, such that said collector lens is pivotally movable relative to said workpiece surface to focus selected diffraction orders of light reflected from said workpiece surface into said detecting means.

4,927,486

SYSTEM FOR APPLYING LABELS TO PALLETS MOVABLE ALONG A CONVEYOR LINE

R. George Fattal, Pierrefonds, and Gordon Ringrose, Pointe-Claire, both of Canada, assignors to Twinpak Inc., Dorval, Canada

Filed May 24, 1989, Ser. No. 356,938

Int. Cl.[5] B32B *31/00*; **G05G** *15/00*; **B65C** *9/40*

U.S. Cl. 156—351 **9 Claims**

1. A system for applying labels to pallets movable along a conveyor line, said conveyor line including a label applying station;

said system comprising:

sensor means for sensing the presence of a pallet at said label applying station;

label printing/dispensing means;

robot arm means mounting thereon label receiving/applying means and label reading means, and including moving means for moving said robot arm means between a first position adjacent said label printing/dispensing means for receiving a label from said label printing/dispensing means, a second position adjacent said label applying station for applying a label to said pallet, and a third position for reading said applied label; and

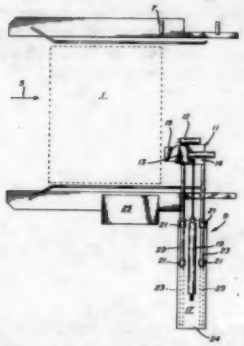
processor means, said processor means receiving inputs from said sensor means, said label printing/dispensing means, and said label reading means, and providing controlling signals to said robot arm means, said label printing/dispensing means and said label reading means;

whereby, when said processor receives a signal from said

sensor means indicating the presence of a pallet to be labelled at said label applying station, said processor controls:

(a) said printing/dispensing means to print a label in accordance with predetermined information;

(b) said robot arm to move to said first position to receive said printed label from said printing/dispensing means;



(c) said printing/dispensing means to dispense said printed label to said robot arm;

(d) said robot arm to move to said second position to apply said printed label to said pallet to be labelled; and

(e) said robot arm to move to said third position to read said applied printed label.

4,927,487

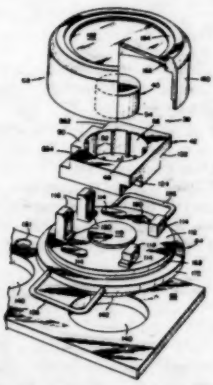
APPARATUS FOR PRODUCING AN ATMOSPHERE OTHER THAN AMBIENT

William A. Gellnas, Hadley, Mass.; Edwin R. Holtz, Enfield; Dennis J. Argazzi, Deep River, both of Conn.; Robert L. Smigel, Higganum, and Dan W. Wiley, Bristol, both of Conn., assignors to Loctite Corporation, Newington, Conn.

Division of Ser. No. 21,445, Mar. 4, 1987, Pat. No. 4,804,435, which is a division of Ser. No. 745,656, Jun. 17, 1985, Pat. No. 4,661,190. This application Nov. 30, 1988, Ser. No. 278,252

Int. Cl.[5] B32B *31/28*

U.S. Cl. 156—351 **21 Claims**



1. Apparatus for producing an atmosphere other than an ambient atmosphere comprising:

container means including:

a base member having inner and outer surfaces, an opening extending between said inner and outer surfaces, and a slitted diaphragm in said opening normally sealing against flow of gases between said inner and outer surfaces; and

a dome member removably sealingly supported on said base member, said base member and said dome member together defining an isolated region;

a source of a gaseous stream to be introduced into said container means taken from at least one of

(a) individual gases

(b) mixture of gases

(c) compounds of gases; and

a needle injector connected to said source movable between a retracted position distant from said diaphragm and an advanced position extending through said diaphragm to deliver the gaseous stream to the isolated region and to force out the ambient air through said diaphragm.

4,927,488

APPARATUS FOR COVERING A TIRE BEAD WITH A TAPE

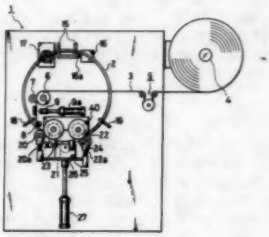
Norio Abe, and Osamu Fukaura, both of Kodaira, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Jun. 20, 1988, Ser. No. 208,538

Claims priority, application Japan, Jun. 18, 1987, 62-150158

Int. Cl.[5] B29D *29/06, 30/48, 30/32*

U.S. Cl. 156—460 **9 Claims**



1. An apparatus for covering a tire bead with a tape comprising:

drive rollers held in contact with an inner circumferential surface of a rotably supported annular tire bead to rotate the tire bead;

tape feed means for sticking a tape onto the inner circumferential surface of said rotating bead while feeding the tape;

flange members fitted around said drive rollers so as to be slidable in their axial direction for cooperating with flange portions provided on said drive rollers so that they may pinch said bead jointly with said fed tape from the opposite sides to stick the tape onto the side surfaces of the bead;

biasing means for biasing said flange members so as to reduce the intervals between said flange portions and flange members;

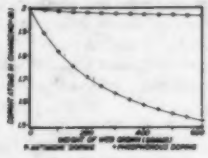
a movable plate having circular notches somewhat larger in diameter than said rollers, disposed as directed in a transverse direction straddling said drive rollers from the above, and movable in the axial direction to expand the intervals between said flange portions and said flange members against said biasing means; and

tape fold-back means for folding back edge portions of the tape onto the outer circumferential surface of said bead.

4,927,489
METHOD FOR DOPING A MELT

Robert B. Campbell, Ben Avon Borough; Edgar L. Kochka, Greentree, and Paul A. Piotrowski, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 2, 1988, Ser. No. 201,228
Int. Cl.[5] H01L *21/208*
U.S. Cl. 156—620.1 2 Claims



1. A method for growing a silicon dewndritic web crystal exhibiting an n-type resistivity, said crystal exhibiting a uniform resistivity over the length of said crystal, said method comprising:

a. placing a silicon charge in a crucible;

b. melting said silicon;

c. placing a quantity of antimony dopant in said charge, allowing said antimony to melt and diffuse into said silicon, thereby producing an antimony-doped silicon melt;

d. growing a silicon dendritic web crystal from said antimony-doped silicon melt;

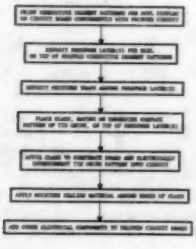
f. replenishing said silicon melt with sufficient silicon to maintain a substantially constant silicon melt level as said crystal is pulled from said melt, said silicon replenishing being done without adding additional dopant to said melt;

g. continuing to grow said crystal up to a crystal weight of at least 600 grams.

4,927,490
METHOD OF MANUFACTURING AN ELECTROLUMINESCENT DISPLAY

Eugene P. Mierzwinski, Fort Wayne, Ind., assignor to Hamilton Standard Controls, Inc., Farmington, Conn.

Division of Ser. No. 197,194, May 23, 1988, Pat. No. 4,839,558.
This application Mar. 24, 1989, Ser. No. 328,382
Int. Cl.[5] B44C *1/22*; C23F *1/02*; C03C *15/00, 25/06*
U.S. Cl. 156—634 4 Claims



1. A method of manufacturing an electroluminescent display (DCEL), having phosphor layers and conductive segment patterns, to be used in conjunction with an electronic assembly substrate carrying various other electrical circuit components electrically connected together by means of a printed circuit made from a conductive layer, with which the DCEL is to be electrically used, comprising the following steps:

(a) defining and making the segment patterns for the DCEL display on the conductive layer concurrently with at least some of the conductive layer pattern that is used for interconnecting the other electrical components;

(b) deposing the phosphor layer(s) for the DCEL on top of the conductive segment patterns;

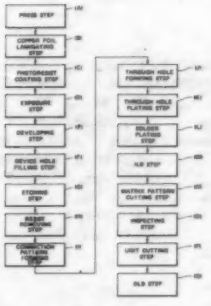
(c) placing a glass element, which has on its inner surface a pattern of tin oxide, over the phosphor depositions; and

(d) affixing the glass element with respect to said substrate and electrically interconnecting the pattern of tin oxide into the circuit; the DCEL becoming an integral part of the electronic assembly substrate, with the substrate becoming an integral part of the DCEL.

4,927,491
METHOD OF BONDING IC UNIT

Hisashi Masaki, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed May 4, 1989, Ser. No. 347,391
Claims priority, application Japan, May 16, 1988, 63-117004
Int. Cl.[5] B44C *1/22*; C23F *1/02*; C03C *15/00, 25/06*
U.S. Cl. 156—630 5 Claims



1. A method of bonding an IC unit, comprising:

a device hole forming step of forming a number of IC device holes in a carrier tape;

an adding step of adding a first metal foil on at least one surface of said carrier tape;

a lead forming step of etching said first metal foil to form a plurality of finger leads each having an end projecting into a corresponding IC device hole, and connection leads for connecting some finger leads to some finger leads each projecting at one end thereof into an adjacent IC device hole;

an inner lead bonding step of arranging an IC device in each IC device hole, and bonding the ends of said finger leads to electrodes of said IC devices;

a cutting step of cutting said carrier tape for forming an IC unit having a single support tape and a plurality of the IC devices which are mounted on said single support tape through said finger leads; and

an outer lead bonding step of arranging said IC units on a substrate having connection terminals, and bonding said finger leads to said connection terminals formed on said substrate.

4,927,492

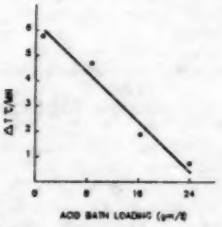
ETCHING PROCESS FOR ZIRCONIUM METALLIC OBJECTS

Armand J. Panson, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 91,225, Aug. 31, 1987, abandoned. This application May 10, 1989, Ser. No. 352,673

Int. Cl.[5] C23F 1/00

U.S. Cl. 156—642 8 Claims



1. In a process for etching of zirconium metallic articles formed from zirconium or a zirconium alloy, wherein said zirconium metallic articles are contacted with a bath of aqueous hydrofluoric acid-nitric acid etching solution in a tank and zirconium dissolves into the bath, and the etching rate of the bath decreases as the zirconium content of the bath increases, and wherein, depending upon the zirconium content of the bath, the bath may then be (1) replenished with acid and further utilized to etch additional zirconium metallic articles, (2) further utilized to etch additional zirconium metallic articles without being replenished with acid, or (3) discarded from the tank, the improvement comprising the steps of:

(a) providing a predetermined volume of a bath of an aqueous hydrofluoric acid-nitric acid etching solution having a known dissolved zirconium content;

(b) immersing an object having a known quantity of a zirconium metal and having a known surface area into said predetermined bath volume;

(c) determining the rate of the rise in temperature of said predetermined volume of said bath over a known period of time upon immersion of said zirconium metal object which rate of rise depends upon the dissolved zirconium content of said bath;

(d) repeating steps (a), (b) and (c) with at least one other known dissolved zirconium content to develop a correlation between the rate of temperature rise in a known time period and the dissolved zirconium content of the bath;

(e) etching zirconium metal articles in the bath of said tank;

(f) providing a portion of said bath of step (e) after etching said zirconium metal articles, said portion having a predetermined volume;

(g) immersing an object having a known quantity of a zirconium metal, and having a known surface area into said portion of said bath having a predetermined volume;

(h) measuring the rate of rise in temperature of said bath portion due to dissolution of said zirconium metal object therein over a predetermined period of time; and

(i) determining the dissolved zirconium metal content of said bath of step (e) by comparing said measured rate of rise of temperature of said bath portion of step (f) with said previously developed correlation.

4,927,493

METHOD FOR MANUFACTURING LIQUID CRYSTAL DEVICE HAVING ELECTRODE STRIPS OF NO USE

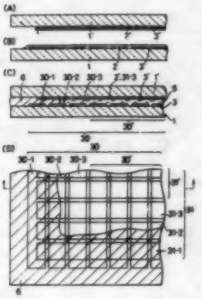
Shunpei Yamazaki, Tokyo; Akira Mase, Atsugi, and Hiroyuki Sakayori, Mochida, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Continuation of Ser. No. 82,544, Aug. 7, 1987, Pat. No. 4,854,675. This application Jul. 21, 1988, Ser. No. 222,635

Claims priority, application Japan, Aug. 7, 1987, 61-186201

Int. Cl.[5] B44C 1/22; B23K 26/00

U.S. Cl. 156—643 6 Claims



1. A method of manufacturing a liquid crystal device comprising the steps of:

coating a first substrate with a conductive film;

scribing said conductive film with an eximer laser to form on the surface of said first substrate a plurality of first electrode strips elongated along an X direction;

coating a second substrate with a conductive film;

scribing the conductive film on the second substrate with an eximer laser to form a plurality of second electrode strips elongated along a Y direction; and

joining said first and second substrates with the first and second electrode strips facing each other with a liquid crystal layer in between where the perimeter of the substrates is sealed.

4,927,494

APPARATUS FOR PREPARING HIGH-CONCENTRATION ALKALI

Robert Winkler, Wallisellen, Switzerland; Siro Sala, Como, Italy; Takayuki Kobayashi, and Shinjiro Yokota, both of Ube, Japan, assignors to Sulzer-Escher Wyss AG, Zürich, Switzerland

Division of Ser. No. 879,105, May 27, 1986, Pat. No. 4,830,707. This application Jun. 2, 1988, Ser. No. 209,335

Claims priority, application European Pat. Off., Apr. 18, 1985, PCT/EP85/00175

Int. Cl.[5] B01D 1/00, 3/00

U.S. Cl. 159—2.1 2 Claims

1. An apparatus for producing high-concentration caustic alkali by concentrating a caustic alkali solution by evaporation at an elevated temperature, comprising:

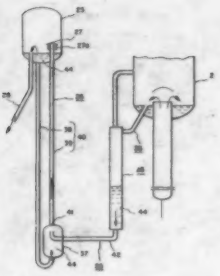
a high pressure evaporation vessel operated at elevated temperature and under a predeterminate pressure above atmospheric pressure;

a low pressure expansion vessel operating under a predeterminate pressure lower than said operating pressure of said high pressure evaporation vessel;

pressure difference absorbing means having a predeterminate length and connecting said high pressure evaporation vessel and said low pressure expansion vessel to each other for gradually absorbing over said predeterminate length a pressure difference between the predeterminate pressure above atmospheric pressure in said high pressure

evaporation vessel and the predeterminate pressure prevailing in said low pressure expansion vessel;

said pressure difference absorbing means is a liquid column having a predeterminate vertical extension defining said predeterminate length of said pressure difference absorbing means and generating a hydrostatic pressure substantially corresponding to said pressure difference between said predeterminate pressure above atmospheric pressure in said high pressure evaporation vessel and said predeterminate pressure prevailing in said low pressure expansion vessel;



said liquid column being part of a substantially U-shaped siphon tube connected between said high pressure evaporation vessel and said low pressure expansion vessel;

an intermediate vessel disposed in a lower region of said liquid column;

a rise-pipe connecting an upper end of said intermediate vessel to a lower end of said low pressure expansion vessel; and

a recirculation pipe connecting a lower end of said intermediate vessel to said lower end of said low pressure expansion vessel.

4,927,495

SUPPORT FOR PHOTOGRAPHIC PRINTING PAPER

Shigehisa Tamagawa, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 29, 1988, Ser. No. 237,369

Claims priority, application Japan, Aug. 29, 1987, 62-21601

Int. Cl.[5] D23E *3/04*; B41C *1/10*

U.S. Cl. 162—135 **8 Claims**

1. A process for producing a support for a photographic printing paper, comprising contacting a wet paper having a front and a back surface and having a water content of between 50 and 80 wt% against the mirror surface of a mirror surface type drier which mirror surface is maintained in the range of 100° C. to 200° C., to obtain a base paper having a Beck smoothness of at least 300 seconds at the front surface of the base paper, further subjecting the paper to treatment as necessary to impart a Beck smoothness of at least 100 seconds to the back surface of the base paper, and coating both the front and back surface of the base paper with a 15 to 50 μm polyolefin layer

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4,927,496

SIZING PULP

Stephen A. Walkden, Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed May 25, 1988, Ser. No. 198,522

Claims priority, application United Kingdom, May 26, 1987, 8712349

Int. Cl.[5] D21H *3/02*

U.S. Cl. 162—136 **18 Claims**

1. The process of using an aqueous emulsion of from about 0.01 to about 0.6 percent, based on the dry weight of the pulp, of ketene dimer size, from about 0.4 to about 4 percent, based on the dry weight of the pulp, of cationic rosin size and insolubilizing agent, for increasing the resistance of the cut edges of liquid packaging board to penetration by hot hydrogen peroxide, said process comprising adding both sizes and the insolubilizing agent either separately or in preblended form to the aqueous pulp slurry at a pH of at least about 7.0.

4,927,497

METHOD OF PREVENTING CELLULOSIC WEB DEGRADATION USING AN AMINE VAPOR

Hillary M. Sharpe, 46 Selvage Lane, Mill Hill, London, NW7 3SP, United Kingdom

Filed Aug. 3, 1988, Ser. No. 227,919

Claims priority, application United Kingdom, Aug. 4, 1987, 8718422

Int. Cl.[5] D21D *3/00*; D21H *5/22*

U.S. Cl. 162—160 **12 Claims**

1. A method of preventing cellulosic fibre web degradation which method comprises permeating a stack of cellulosic fibre webs with an amine vapour so as to pass amine vapour through said stack, and disposing an amine-immobilizing agent to contact amine vapour which has passed through at least part of said stack, the immobilizing agent being in an amount sufficient to take up or condense excess amine vapour.

4,927,498

RETENTION AND DRAINAGE AID FOR PAPERMAKING

John D. Rushmere, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 143,350, Jan. 13, 1988, abandoned. This application Jun. 30, 1988, Ser. No. 213,484

Int. Cl.[5] D21H *3/78*

U.S. Cl. 162—168.3 **7 Claims**

1. In a papermaking process in which an aqueous paper furnish containing cellulosic pulp, and optionally also mineral fillers is formed and dried, the improvement comprising adding to said pulp from about 0.01 to about 1.0 wt. percent, based on the dry weight of the paper furnish, of a water soluble alkali metal polyaluminosilicate microgel formed from the reaction of polysilicic acid and an alkali metal aluminate and comprising aggregates of particles in which each particle has a surface area of at least about 1000 meters^2/gram, the polyaluminosilicate microgel having an alumina/silicate mole ratio greater than about 1/100, and from about 0.01 to about 2.0 wt. percent, based on the dry weight of the paper furnish of a water soluble cationic polymer capable of flocculating fiber and filler fines.

4,927,499

APPARATUS FOR STABILIZING THE JET FLOW EXITING A HEADBOX OF A PAPER MACHINE

Kai Wikman, Virkkala, Finland, assignor to Valmet-Ahlstrom, Inc., Karhula, Finland

Filed Dec. 19, 1988, Ser. No. 286,517

Claims priority, application Finland, Dec. 23, 1987, 875693

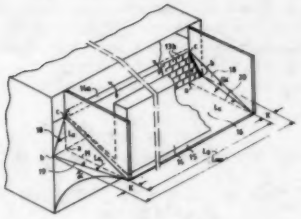
Int. Cl.[5] D21F *1/02*

U.S. Cl. 162—336 **10 Claims**

1. A headbox for the delivery of a stock jet having a direction of flow to a moving forming wire comprising:

a slice channel having a machine direction vertical plane, a center, and an elongated slice opening; said slice channel being defined by a bottom wall and a top wall each extending in the direction of said elongation and by two opposed side walls extending between said bottom and top

walls, said opposed side walls converging in a cross-flow direction toward said slicing opening;



and being substantially planar and inclined relative to said machine direction vertical plane toward the center of the slice channel.

4,927,500

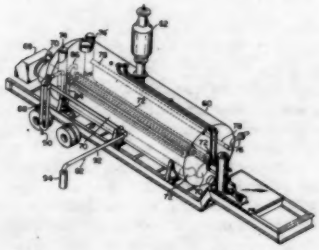
WASTE OIL PURIFYING APPARATUS

Charles K. Martin, Boonton, N.J., assignor to Infern-O-Therm, Keyport, N.J.

Continuation of Ser. No. 537,278, Sep. 29, 1983, abandoned. This application Aug. 12, 1985, Ser. No. 764,962

Int. Cl.[5] B01D *1/02*; C10G *1/02*

U.S. Cl. 196—46 **12 Claims**



1. Apparatus for recovering a finished oil product from crude or waste oil contaminated with water and the like, comprising:

a tank for receiving and containing a certain amount of waste oil, and including exhausting means for exhausting waste gasses from said tank;

burner means including a chamber inside said tank, for heating the waste oil contained in said tank to produce (i) waste gases including light ends from the waste oil in said tank, and (ii) a desired finished oil product from the waste oil in said tank, wherein said burner means is arranged to provide a heating flame to produce fire in said chamber, the waste oil being inside said tank and outside said chamber of said burner means so as to be isolated from direct contact with the flame of said burner means;

said waste gases being kept separate from combustion gas products produced by said burner means;

means for feeding back said waste gases from said exhausting means to said chamber;

afterburner means associated with said burner means and arranged inside of said tank and at least partly within said chamber, for combusting, inside said chamber, the fed back waste gases produced from the waste oil in said tank with the flame of said burner means to obtain additional heat from the combustion of the fed back waste gases for heating the waste oil contained in said tank;

means for exhausting said combustion gas products from said burner means;

outlet means coupled to said tank for discharging the finished oil product recovered from the waste oil in said tank.

4,927,501

OVEN DOOR

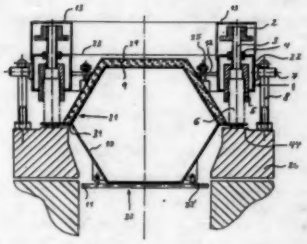
Wolfgang Becker, Bochum, Fed. Rep. of Germany, assignor to Ruhrkohle AG, Essen, Fed. Rep. of Germany

Filed Jul. 28, 1988, Ser. No. 225,686

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1987, 3725537; Dec. 19, 1987, 3743156

Int. Cl.[5] C10B *25/06*

U.S. Cl. 202—248 **17 Claims**



1. An oven door assembly comprising a peripheral door frame, a peripheral sealing means secured to said door frame for sealing an oven door opening and a metal heat shield, said metal heat shield comprising:

a multiplicity of elongated metal members having elongated axes;

means for retaining said elongated metal members in at least one array in which said elongated axes are disposed generally parallel to each other within a plane, said retaining means extending across said elongated metal members at spaced points along the axes of said members and maintaining a space between adjacent members of said elongated metal members in the array; and

means for supporting said array of elongated metal members on said sealing means so as to extend parallel to the door frame and sealing means and thereby shield the same from heat generated in an oven.

4,927,502

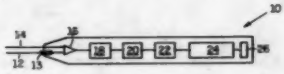
METHODS AND APPARATUS USING GALVANIC IMMUNOELECTRODES

Christopher L. Reading, Kingwood, Tex.; Malcolm R. Smyth, and Richard O'Kennedy, both of Dublin, Ireland, assignors to Board of Regents, The University of Texas, Austin, Tex.

Filed Jan. 31, 1989, Ser. No. 304,739

Int. Cl.[5] G01N *27/50*

U.S. Cl. 204—153.1 **22 Claims**



1. A method for measuring the level of a complementary immunochemical reactant in a conductive aqueous solution, comprising the steps of:

providing a first electrode and a second electrode, the electrodes having surfaces and generating a galvanic current when electrically interconnected and immersed in a conductive aqueous solution;

binding a selected immunochemical reactant to the surface of the first electrode;

electrically interconnecting the first and second electrodes;
immersing the electrodes in a conductive aqueous solution containing the complementary immunochemical reactant to the bound immunochemical reactant;
measuring the galvanic current generated by the immersed electrodes as a function of time;
calculating the level of the complementary immunochemical reactant in the solution by comparing the measured current with a standard current;
wherein the standard current substantially represents the galvanic current as a function of time generated by the electrodes when immersed in a standard solution, the standard solution being a solution having similar conductivity to the conductive aqueous solution and containing no complementary immunochemical reactant.

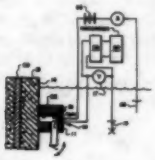
11. A device for measuring the level of a complementary immunochemical reactant in a conductive aqueous solution, comprising:
a first electrode having a surface and having a selected immunochemical reactant bound to its surface and a second electrode, the electrodes generating a galvanic current when electrically interconnected and immersed in a conductive aqueous solution;
an electrical interconnection between the first and second electrodes;
means for measuring the galvanic current generated by the first and second electrodes as a function of time when immersed in a conductive aqueous solution;
means for comparing the measured galvanic current with a standard current and calculating the level of the complementary immunochemical reactant;
wherein the standard current substantially represents the galvanic current as a function of time generated by the electrodes when immersed in a standard solution, the standard solution being a solution having similar conductivity to the conductive aqueous solution and containing no complementary immunochemical reactant.

4,927,503

METHOD FOR ASSESSMENT OF CORROSION ACTIVITY IN REINFORCED CONCRETE

Daniel R. Polly, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 196,186, May 16, 1988, abandoned. This application Feb. 10, 1989, Ser. No. 308,596
Int. Cl.[5] G01N 17/02
U.S. Cl. 204—153.11 **1 Claim**



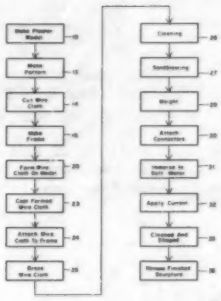
1. A method for nondestructive detecting, locating and measuring of the corrosion activity of a metal reinforcement in a concrete marine structure by direct detection of electrochemical current flow, comprising the steps of:
a. first, establishing a baseline potential by measuring the freely corroding electrical potential of a probe electrode relative to a remote underwater reference electrode;
b. secondly, positioning said probe electrode in sealing engagement against the underwater surface of said concrete structure such that the measurement path is effectively restricted to the path from said probe electrode through said concrete structure and surrounding water to said remote electrode, and then measuring the electrical potential between said probe electrode and said remote reference electrode; the potential difference between the first and second potential measurements being the IR drop caused by corrosion currents flowing through said concrete structure, and attributable to the electrochemical corrosion of said metal reinforcement.

4,927,504

SCULPTURE PROCESS

Christopher R. Scala, 1666 Summer Way, Winter Park, Fla. 32789

Filed Sep. 14, 1989, Ser. No. 407,144
Int. Cl.[5] C25D 9/08
U.S. Cl. 204—23 **10 Claims**



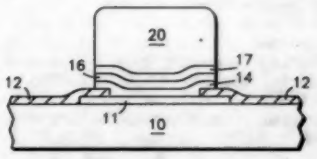
1. A process of making a sculpture comprising the steps of:
making a shaped sculpture model;
shaping a metal wire cloth over said said sculpture model;
forming a support frame for a sculpture;
attaching said shaped metal wire cloth to said support frame;
connecting a conductor to said shaped wire cloth on said frame to act as one electrode of an electrolytic cell;
placing said shaped metal wire cloth attached to said frame in an electrolyte;
positioning an electrode adjacent said metal wire cloth and frame in said electrolyte; and
applying a voltage between said electrodes for a predetermined time to thereby electrolytically coat said metal wire cloth to form an acreted sculpture over said shaped metal wire cloth.

4,927,505

METALLIZATION SCHEME PROVIDING ADHESION AND BARRIER PROPERTIES

Ravinder K. Sharma, Mesa; Harry J. Geyer, Phoenix, and Douglas G. Mitchell, Tempe, all of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Division of Ser. No. 215,108, Jul. 5, 1988, Pat. No. 4,880,708. This application Jul. 28, 1989, Ser. No. 386,058
Int. Cl.[5] H01L 21/48, 21/28, 21/308; C25D 7/12
U.S. Cl. 204—34.5 **17 Claims**



1. A method of fabricating a structure for providing adhe-

sion and barrier properties to a semiconductor substrate having a surface, comprising the steps of:

providing a first conductor layer made of a conductive metal on at least a portion of the surface of the substrate;

forming a passivation layer on the surface of the substrate and the first conductor layer, and having at least one opening to the first conductor layer;

forming a second conductor layer made of titanium-tungsten-nitride on the first conductor layer and the passivation layer;

forming a third conductor layer made of titanium-tungsten on the second conductor layer, and;

forming a fourth conductor layer made of a conductive metal on the third conductor layer.

4,927,506

HIGH-PERFORMANCE ELECTRODEPOSITED CHROMIUM LAYERS FORMED AT HIGH CURRENT EFFICIENCIES

Nicholas M. Martyak, Hazlet, N.J., assignor to Atochem North America, Inc., Somerville, N.J.

Filed Sep. 14, 1989, Ser. No. 407,174

Int. Cl.[5] C25D 3/04

U.S. Cl. 204—51 **16 Claims**

1. A functional chromium plating bath consisting essentially of chromic acid, from about 40 to about 150 g/l. of sulfoacetic acid, said bath being substantially free of other carboxylic acids, and substantially free of fluoride ion, chloride ion and phosphate ion, and further having selenate or tellurate ions in the bath, present in the amount of from about 0.1 to about 1.0 g/l. each.

4,927,507

NOVEL PROCESS FOR THE MANUFACTURE OF 4-ACYLOXY-3-HYDROXYETHYL-AZETIDINONES

Peter Schneider, Bottmingen; Gerardo Ramos, Arlesheim, and Jacques Bersier, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

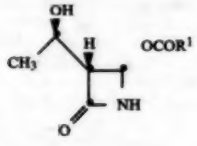
Filed Apr. 27, 1988, Ser. No. 186,547

Claims priority, application Switzerland, May 4, 1987, 1683/87

Int. Cl.[5] C25B 3/02

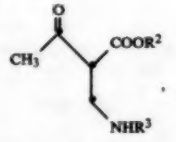
U.S. Cl. 204—78 **6 Claims**

1. A process for the manufacture of compounds of formula



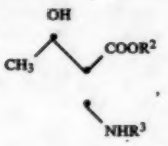
(I)

in which R^1 represents lower alkyl or aryl, characterised in that a compound of formula



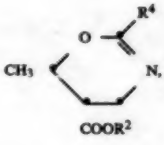
(II)

in which R^2 represents hydrogen or an esterifying radical and R^3 represents hydrogen or the acyl radical of a carboxylic acid or of a carbonic acid semiester, or a salt thereof, is reduced with an enantioselective reducing agent, a resulting compound of formula



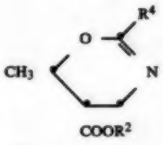
(IIIa)

in the case when R^2 and/or R^3 represent(s) hydrogen, is in any sequence esterified or acylated with a reagent that introduces the acyl radical of a carboxylic acid or of a carbonic acid semiester, and the resulting compound, or the compound of formula IIIa in which R^2 already represents an esterifying radical and R^3 already represents the acyl radical of a carboxylic acid or of a carbonic acid semiester, or a salt thereof, is cyclised with an agent that activates the hydroxy group, a resulting compound of formula



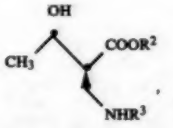
(IV)

in which R^2 represents an esterifying radical and R^4 represents the radical of a carboxylic acid or of a carbonic acid semiester R^4COOH, is isomerised with a base, and a resulting diastereoisomer of formula



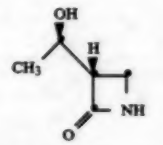
(IVa)

is hydrolysed, the resulting compound of formula



(IIIb)

in which R^2 and R^3 represent hydrogen, or a salt thereof, is cyclised with an agent removing the elements of water, and the resulting compound of formula



(V)

is oxidatively acylated electrochemically with an agent that introduces the radical $R^1COO—$.

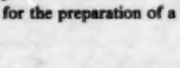
4,927,508

ALKYL 2-FLUORO-1-METHOXYETHYLCARBAMATES

James M. Renga, Walnut Creek; Charles K. Pon, Concord; Aylin H. Gulbenkian, and Michael G. Smith, both of Walnut Creek, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 154,762, Feb. 11, 1988, Pat. No. 4,845,267.
This application Feb. 7, 1989, Ser. No. 307,397
Int. Cl.[5] C25B 3/02
U.S. Cl. 204—79 11 Claims

1. A process for the preparation of a compound of the formula



wherein R represents C_1–C_4 alkyl

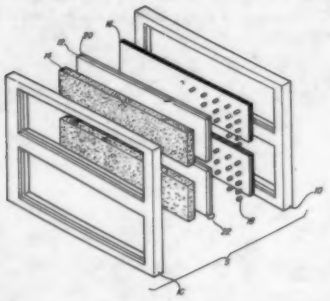
which comprises passing an electrical current through a mixture containing a C_1–C_4 alkyl 2-fluoroethylcarbamate, an electrolyte and methanol under conditions conducive to electrochemical oxidation.

4,927,509

BIPOLAR ELECTROLYZER

Indresh Mathur, Sarnia; Allan James, Wallaceburg, and David Bissett, Bright's Grove, all of Canada, assignors to H-D Tech Inc., Woodbridge, Canada

Filed Jun. 4, 1986, Ser. No. 870,474
Int. Cl.[5] C25B 1/30
U.S. Cl. 204—83 22 Claims



1. An electrode assembly exhibiting improve electrolyte flow through a diaphragm thereof when used in an electrochemical cell, said assembly comprising:

(A) a liquid permeable, multiple layered diaphragm;

(B) a porous, self-draining electrode, and

(C) a current distributor; said current distributor and said diaphragm each being in contact with an opposite face of said electrode wherein said assembly exhibits substantially no voltage penalty as compared to use of an electrode assembly having said diaphragm and said current distributor located on the electrolyte side of said electrode.

14. A process for the manufacture of an alkaline peroxide aqueous solution by the electrolysis of an aqueous electrolyte in a bipolar, filter press type, electrolytic cell; said cell comprising a bipolar anode/current distributor; a liquid permeable diaphragm; a porous, self-draining cathode and an electrically nonconductive spacing means; wherein said cathode is in contact with a current distributor on one face of said cathode and is in contact with said liquid permeable diaphragm on an opposite face of said cathode; wherein said liquid permeable diaphragm comprises multiple layers of (A) a microporous polyolefin film or (B) a composite comprising said microporous polyolefin film and a support fabric resistant to deterioration upon exposure to electrolyte and electrolysis products thereof; wherein said anode/current distributor comprises stainless steel or a composite of a coated electrically conductive substrate, said substrate selected from the group consisting of nickel and a nickel coated substrate, wherein said nickel or nickel coated substrate is coated with an electrocatalytically effective amount of cobalt and tungsten compounds; and wherein said nonconductive spacing means separates said liquid permeable diaphragm and said anode, said process comprising:

(A) flowing a gas into a portion of said self-draining cathode;

(B) controllably flowing a liquid electrolyte through said liquid permeable diaphragm into a portion of said self-draining cathode at a rate about equal to the drainage rate of the cathode;

(C) electrolytically reacting said liquid electrolyte with said gas to form at least one non-volatile product; and

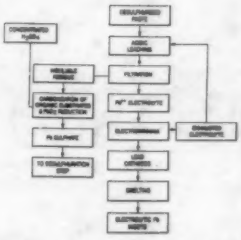
(D) removing the products of electrolysis from said self-draining cathode.

4,927,510

HYDROMETALLURGICAL PROCESS FOR RECOVERING IN PURE METAL FORM ALL THE LEAD CONTAINED IN THE ACTIVE MASS OF EXHAUSTED BATTERIES

Marco Olper, Monza, and Pierluigi Fracchia, Milan, both of Italy, assignors to Engitec Impianti S.p.A., Italy

Filed Oct. 17, 1988, Ser. No. 258,596
Claims priority, application Italy, Oct. 20, 1987, 22348 A/87
Int. Cl.[5] C25C 1/18
U.S. Cl. 204—114 5 Claims



1. A process for recovering in pure metal form substantially all lead from battery sludge containing lead compounds including lead dioxide and lead sulfate and containing organic substances of the form $C_n(H_2O)_m$ comprising the steps of:

(a) desulfurizing battery sludge to form a desulfurized paste;

(b) leaching said desulfurized paste with an aqueous solution of an acid selected from the acids suitable for electrowinning to form a liquid/solid mixture;

(c) separating said liquid/solid mixture by press-filtering and washing to form a filtrate containing Pb^{++} ions and an insoluble residue consisting essentially of lead dioxide organic substances and moisture;

(d) treating said filtrate by electrowinning to produce lead in pure metal form and an exhausted electrolyte;

(e) treating said insoluble residue formed in step (c) with concentrated sulfuric acid sufficient to cause the simultaneous occurring of the following reactions:

$$C_n(H_2O)_m + H_2SO_4 \rightarrow nC + H_2SO_4 \cdot mH_2O \quad (1)$$

$$C + 2PbO_2 + 2H_2SO_4 \rightarrow 2PbSO_4 + CO_2 + 2H_2O \quad (2)$$

up to the quantitative reduction of substantially all of the lead dioxide PbO_2 and elimination of substantially all the organic substances $C_n(H_2O)_m$ contained in said insoluble residue; and

(f) feeding the so-treated insoluble residue to the desulfurizing of step (a).

4,927,511

METHOD AND DEVICE FOR BREAKING A DISPERSE SYSTEM IN AN ELECTROCHEMICAL CELL

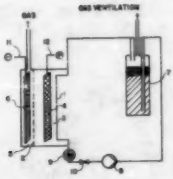
Volker Friehmelt, Wollstadt; Bernhard Maier, Amberg; Alfons Kohling, Eschborn, and Rolf-Eberhard Schmitt, Nackenheim, all of Fed. Rep. of Germany, assignors to Battelle-Institut e.V., Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 271,649

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1987, 3739580

Int. Cl.[5] C02F *1/46*

U.S. Cl. 204—151 **11 Claims**



1. Method of breaking a disperse system in form of oil-in-water emulsions, comprising: neutralizing the electrical charges in a medium containing a non-ionically or ionically stabilized oil-in-water emulsion flowing through a working electrode compartment within an electrode compartment subdivided by an ion exchanger membrane into a working electrode compartment and a counterelectrode compartment such that the ultrafine constituents of the emulsion combine to form larger agglomerates using a working electrode consisting of a corrosion-resistant material; and separating the agglomerated constituents from the residual medium outside of said electrode compartment in a separator attached thereto in a circuit.

4,927,512

PROCESS FOR PRODUCTION OF HYDROGEN PEROXIDE BY A CHEMICAL PHOTOREDUCTION OF OXYGEN, AND HYDROGEN PEROXIDE OBTAINED BY THIS PROCESS

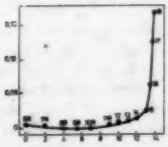
Francisco F. de la Rosa; Jose A. Navarro; Mercedes Roncel, and Miguel A. de la Rosa, all of Sevilla, Spain, assignors to Interox (Société Anonyme), Brussels, Belgium

Filed May 5, 1988, Ser. No. 190,552

Claims priority, application Spain, May 5, 1987, 8701334

Int. Cl.[5] B01J *19/08*

U.S. Cl. 204—157.5 **8 Claims**



1. A process for the manufacture of hydrogen peroxide, comprising:

photoreduction of molecular oxygen in an aqueous medium at a pH above 9 in the presence of visible light, semicarbazide and a photosensitizer selected from among Bengal Rose and ruthernium II trichelate complex with the ligand (2,2'-dipyridyl) referred to by the abbreviation $Ru(bpy)_3^{2+}$.

4,927,513

METHOD AND ARRANGEMENT FOR FABRICATING MAGNETO-OPTICAL, STORABLE, AND/OR DELETABLE DATA CARRIERS

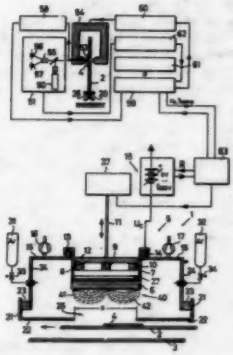
Eberhard Schultheiss, Herborn, and Peter Wirz, Waldernbach, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 6, 1989, Ser. No. 294,734

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, 3800449

Int. Cl.[5] C23C *14/54*

U.S. Cl. 204—192.13 **27 Claims**



1. A method for fabricating a magneto-optical, storable, and/or deletable data carrier, including the steps of:

operating a magnetron sputtering system (1) to apply a layer comprising different magnetic materials, with different specific weights, on a substrate (4), wherein the magnetron system (1) produces a magnetic field; and

controlling the chemical composition of the layer by controlling the magnetic field of the magnetron system (1).

4,927,514

PLATINUM BLACK AIR CATHODE, METHOD OF OPERATING SAME, AND LAYERED GAS DIFFUSION ELECTRODE OF IMPROVED INTER-LAYER BONDING

Frank Solomon, Great Neck, and Yury Genodman, Brooklyn, both of N.Y., assignors to Eltech Systems Corporation, Boca Raton, Fla.

Filed Sep. 1, 1988, Ser. No. 239,582

Int. Cl.[5] C25B *11/00*

U.S. Cl. 204—290 R **19 Claims**

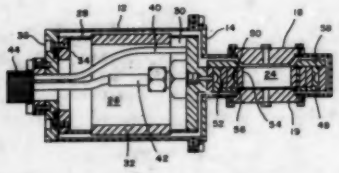
1. An electrode in multi-layer form and having enhanced inter-layer bonding, said electrode comprising a gas porous, polymer-containing support layer, a catalyst-containing and polymer-containing active layer and a gas porous intermediate bonding layer consisting of thermoplastic hydrophobic polymer.

4,927,515

CIRCULAR MAGNETRON SPUTTERING DEVICE

Douglas L. Keith, Santa Clara, Calif., assignor to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Jan. 9, 1989, Ser. No. 295,237
Int. Cl.[5] C23C 14/34, 14/56
U.S. Cl. 204—298.21 5 Claims



1. A circular magnetron sputtering device comprising

a cathode structure including an annular magnet and an annular body of target material positioned coaxially with and inside of said annular magnet,

adapter means including a central insulating body portion of cylindrical configuration and an electrically conductive end portion attached to said central insulating portion and to said cathode structure generally perpendicular to the axis of said annular magnet for supporting said cathode structure,

an anode structure spaced from and in juxtaposition with openings of said annular magnet, said anode structure including a housing for receiving said adapter means,

electrical power interconnect means connected to said electrically conductive end portion of said adapter means for energizing said cathode structure, and

means for providing a coolant flow through said cathode structure.

4,927,516

ENZYME SENSOR

Shuichiro Yamaguchi, Fuji; Naoto Uchida; Takeshi Shimomura, both of Fujinomiya, and Noboru Oyama, Fuchu, all of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 24, 1987, Ser. No. 65,908
Claims priority, application Japan, Jun. 27, 1986, 61-149753
Int. Cl.[5] G01N 27/30
U.S. Cl. 204—403 36 Claims

1. An enzyme sensor for measuring a substrate concentration using an enzyme, comprising:

an electrically conductive carbon having a graphite structure for generating an electric potential responsive to a hydrogen ion concentration;

an enzyme layer comprising an enzyme imparted with a cross-linked structure by a cross-linking agent coating a surface of said electrically conductive carbon having a graphite structure, said enzyme layer being capable of generating a change in said hydrogen ion concentration by promoting the chemical reaction of a substrate on which said enzyme is active; and

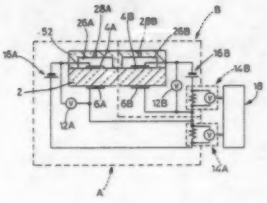
measuring means for measuring the electric potential of said electrically conductive carbon having a graphite structure.

4,927,517

NOX SENSOR HAVING CATALYST FOR DECOMPOSING NOX

Yoshihiko Mizutani, Nagoya, and Hitoshi Nishizawa, Iwakura, both of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Apr. 27, 1989, Ser. No. 343,682
Claims priority, application Japan, Apr. 30, 1988, 63-108049
Int. Cl.[5] G01N 27/58
U.S. Cl. 204—406 14 Claims



1. An NOx sensor for determining the concentration of NOx contained in a measurement gas, comprising:

an electrochemical cell having a solid electrolyte body, and at least two electrodes, formed on said solid electrolyte body, which includes a first electrode exposed to said measurement gas and a second electrode;

diffusion-resistance means for restricted communication of said first electrode with an external space in which said measurement gas exists, said diffusion-resistance means having a predetermined resistance to diffusion of said measurement gas therethrough from said external space toward said first electrode;

a catalyst disposed adjacent said first electrode, for decomposing NOx contained in an atmosphere adjacent said catalyst;

current applying means for applying an electric current between said first and second electrodes of said electrochemical cell;

current measuring means for detecting an electric current flowing between said first and second electrodes;

oxygen partial pressure measuring means for detecting an oxygen partial pressure of the atmosphere adjacent said catalyst; and

control means for calculating the concentration of NOx contained in said measurement gas, based on a first current value and a second current value, said first current value being detected by said current measuring means when said oxygen partial pressure detected by said oxygen partial pressure measuring means is higher than a predetermined level above which the decomposition of NOx by said catalyst will not occur and below which said decomposition of NOx will occur, and said second current value being detected by said curent measuring means when said oxygen partial pressure detected by said oxygen partial pressure measuring means is lower than said predetermined level.

4,927,518
REFERENCE ELECTRODE HAVING IMMOBILIZED ELECTROLYTE

Gunter Tauber, Kriftel, and Andrea Dornauf, Kelkheim, both of Fed. Rep. of Germany, assignors to Schott Glaswerke, Fed. Rep. of Germany

Filed Jun. 1, 1989, Ser. No. 359,972

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818846

Int. Cl.[5] G01N 27/30

U.S. Cl. 204—421 9 Claims

5. A reference electrode comprising:

a solidified body of hydraulically setting cementitious material including an electrolyte which is mixed in the material before it is set and wherein said cementitious material is based on materials selected from the group consisting of calcium silicates, calcium aluminates, gypsum, high alumina cement, controlled setting cement, Roman cement and sulphate blast furnace cement, plaster and trass cement, said body further including a filler selected from the group consisting of pozzolan, glass and quartz powder,

an electrode element embedded in said body and an electrical conductor connected to said element and extending through said body to the outside thereof.

4,927,519
METHOD FOR CONTROLLING FOULING DEPOSIT FORMATION IN A LIQUID HYDROCARBONACEOUS MEDIUM USING MULTIFUNCTIONAL ANTIFOULANT COMPOSITIONS

David R. Forester, Spring, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.

Continuation-in-part of Ser. No. 177,252, Apr. 4, 1988, Pat. No. 4,828,674. This application Jun. 17, 1988, Ser. No. 208,203

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.[5] C10G 9/12

U.S. Cl. 208—48 AA 83 Claims

1. A method of inhibiting fouling deposit formation in a liquid hydrocarbonaceous medium, undergoing processing wherein in the absence of such fouling inhibition, fouling deposits would normally be formed within said medium, said method comprising adding to said medium an effective amount of an antifoulant composition comprising:

Component (1) an alkyl phosphonate phenate sulfide antifoulant compound formed from the reaction of an alkyl (C_1–C_{24}) phenol sulfide and phosphoric acid; and at least one additional compound selected from the group consisting of:

Component (2) an effective antioxidant compound or compounds to inhibit oxygen based polymerization of said hydrocarbon medium selected from the group consisting of: phenylenediamine compounds, substituted phenolic compounds, quinone and its derivatives; or phenothiazine and its derivatives;

Component (3) a corrosion inhibiting compound or compounds to reduce corrosion of metal surfaces in contact with said hydrocarbon medium during processing thereof, selected from the group consisting of: tetrahydropyrimidines; imidazolines; reaction products of alkylene polyamines and aliphatic carboxylic acids and optionally further reacted with paraformaldehyde to give heterocyclic compounds; magnesium, calcium or amine sulfonates; reaction products of ethylene or propylene oxide with alkyl phenol to yield aromatic ethers or reaction products of a tallowpolyamine and an alkylacrylate; and

Component (4) a metal deactivator compound or compounds adapted to complex with metallic impurities in said hydrocarbon medium selected from the group consisting of: N,N'-disalicylidene-1,2-cyclohexanediamine; 2,5-dimercapto-1,3,4-thiadiazole and its derivatives; or reaction products of alkyl phenol, aldehyde and polyamines to yield Mannich products; and mixtures thereof.

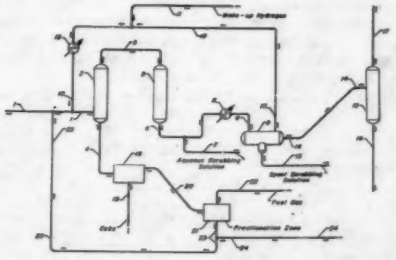
4,927,520
PROCESS FOR TREATING A HYDROCARBONACEOUS STREAM CONTAINING A NON-DISTILLABLE COMPONENT TO PRODUCE A HYDROGENATED DISTILLABLE HYDROCARBONACEOUS PRODUCT

Tom N. Kalnes, La Grange; Robert B. James, Jr., Northbrook, and Darrell W. Staggs, Crystal Lake, all of Ill., assignors to UOP, Des Plaines, Ill.

Filed Nov. 2, 1988, Ser. No. 265,969

Int. Cl.[5] C10G 69/06, 69/10

U.S. Cl. 208—50 14 Claims



1. A process for treating a hydrocarbonaceous stream containing a non-distillable component to produce a hydrogenated distillable hydrocarbonaceous product while minimizing thermal degradation of said hydrocarbonaceous stream which process comprises the steps of:

(a) contacting said hydrocarbonaceous stream with a hot first hydrogen-rich gaseous stream having a temperature greater than said hydrocarbonaceous stream in a flash zone at flash conditions thereby increasing the temperature of said hydrocarbonaceous stream without indirect heat exchange and vaporizing at least a portion thereof to provide a hydrocarbonaceous vapor stream comprising hydrogen and a heavy stream comprising said non-distillable component;

(b) contacting said hydrocarbonaceous vapor stream comprising hydrogen with a hydrogenation catalyst in a hydrogenation reaction zone at hydrogenation conditions to increase the hydrogen content of the hydrocarbonaceous compounds contained in said hydrocarbonaceous vapor stream;

(c) condensing at least a portion of the resulting effluent from said hydrogenation reaction zone to provide a second hydrogen-rich gaseous stream and a liquid stream comprising hydrogenated distillable hydrocarbonaceous compounds;

(d) recovering a hydrogenated distillable hydrocarbonaceous product from said liquid stream comprising hydrogenated distillable hydrocarbonaceous compounds; and

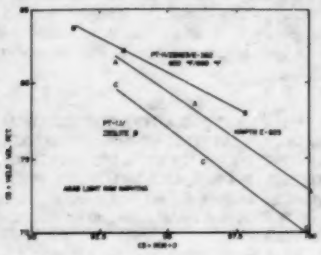
(e) reacting at least a portion of said heavy stream comprising said non-distillable component recovered from step (a) in a thermal coking zone at thermal coking conditions to provide a thermal coking zone effluent.

4,927,521

METHOD OF PRETREATING A NAPHTHA

Yung F. Chu, Plainsboro, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 30, 1988, Ser. No. 238,678
Int. Cl.[5] C07C 35/06
U.S. Cl. 208—65 27 Claims



1. A method of pretreating a raw naphtha feedstream comprising contacting said naphtha feedstream with a noble metal-/alkali metal-containing zeolite naphtha reforming catalyst, said catalyst containing from about 0.1–1.0 wt. % of said noble metal and an amount of said alkali metal which exceeds the cationic exchange capacity of said zeolite, at a pressure of about 0 to about 1000 psig, a temperature of about 550° F. to about 850° F., a hydrogen to hydrocarbon molar ratio of about 0.1 to 1 to about 15 to 1 and a weight hourly space velocity of about 0.5 to about 20, thereby increasing the yield of C_4^+ and C_5^+ gasoline and thereafter catalytically reforming said treated naphtha.

4,927,522

MULTIPLE FEED POINT CATALYTIC CRACKING PROCESS USING ELUTRIABLE CATALYST MIXTURE

Joseph A. Herbst, Turnersville; Hartley Owen, Belle Mead, both of N.J., and Paul H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 30, 1988, Ser. No. 292,206
Int. Cl.[5] C10G 11/05, 11/18
U.S. Cl. 208—120 12 Claims

1. A fluidized catalytic cracking (FCC) process wherein a source of hot, regenerated cracking catalyst having a settling velocity contacts a heavy hydrocarbon feed in a vertical riser reactor adapted to maintain said catalyst and said heavy feed as a dilute phase, said reactor having a cross-sectional area and a base, to produce a mixture of cracked products and spent catalyst, wherein spent catalyst is stripped and charged to a catalyst regeneration zone to produce the hot, regenerated catalyst characterized by use of an elutriable mixture of conventionally sized FCC catalyst and a separate additive catalyst having a higher settling velocity than the conventionally sized FCC catalyst and comprising a shape selective zeolite having a Constraint Index of about 1–12 in a riser having a lower and an upper elutriating section of increased cross-sectional area relative to the riser, and further characterized by

(a) charging to said lower elutriating section at least a portion of said elutriable catalyst mixture and a hydrocarbon feed comprising 1–50 wt % of a light, hydrogen-rich fraction comprising C_5^- hydrocarbons and 50–99 wt % straight run naphtha hydrocarbons having a boiling range between C_5–460° F. to generate in said lower elutriating section reactive fragments and an upgraded straight run naphtha fraction which are discharged up from said lower elutriating section into the dilute phase riser which is contiguous with and above said lower elutriating section;

(b) adding a resid feed to the base of the dilute phase riser and reacting in said dilute phase riser resid with reactive fragments generated in said lower elutriating section;

(c) adding to an upper portion of said dilute phase riser additional hot regenerated elutriable catalyst mixture and adding gas oil boiling range hydrocarbons and discharging the dilute phase transport riser up into the base of the upper elutriating section which is contiguous with and above said riser;

(d) adding to said upper elutriating section a recycled hydrocarbon fraction comprising hydrocarbons boiling within the range of 200°–500° F.;

(e) discharging from the top of the riser cracked products and catalyst.

4,927,523

ADDITION OF SHAPE SELECTIVE ZEOLITES TO CATALYTIC CRACKING UNITS

Susan P. Donnelly, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 12, 1988, Ser. No. 282,785
Int. Cl.[5] C10G 11/05, 11/18
U.S. Cl. 208—120 15 Claims

1. A method of adding an additive zeolite having a constraint index of 1–12 to a catalytic cracking unit wherein a heavy feed is added at a given feed rate to a catalytic cracking unit and contacts a source of hot, regenerated equilibrium catalytic cracking catalyst to produce cracked products including gasoline having an octane number, C_3/C_4 hyrdrocarbons and heavy products boiling above the gasoline boiling range, and wherein the severity of the catalytic cracking operation is controlled to achieve a specified conversion of feed to products characterized by

(a) adding at least 0.5 wt. % additive, based on zeolite content of the additive and the total weight of the equilibrium catalyst inventory in the catalytic cracking unit, to the catalytic cracking unit within a 24 hour period to produce an unacceptable increase in C_3/C_4 production;

(b) adjusting the feed rate or the severity of the catalytic cracking operation or both to reduce the production of C_3/C_4 to an acceptable level;

(c) aging in the catalytic cracking unit the zeolite additive, said aging reducing the cracking activity of the additive zeolite and thereby reducing the production of C_3/C_4; and

(d) increasing the feed rate or the severity of the catalytic cracking operation or both to achieve the specified conversion of feed without producing unacceptable amounts of C_3/C_4, and recovering a gasoline boiling range product having an increased octane number.

4,927,524

PROCESS FOR REMOVING VANADIUM AND SULPHUR DURING THE COKING OF A HYDROCARBON FEED

Domingo Rodriguez, Edo Miranda, and Cebers Gomez, San Antonio de los Altos, both of Venezuela, assignors to Intevep, S.A., Caracas, Venezuela

Filed May 10, 1989, Ser. No. 350,122
Int. Cl.[5] C10G 9/14
U.S. Cl. 208—131 6 Claims

1. A process for producing metallurgical grade coke from a hydrocarbon feedstock characterized by high vanadium and sulphur contents comprising:

(a) feeding said hydrocarbon feedstock to a coking drum;

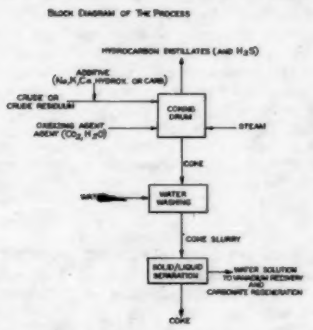
(b) feeding an additive selected from the group consisting of carbonates and hydroxides of Na, K, Ca and mixtures thereof to said coking drum;

(c) feeding an oxidizing agent to said coking drum;

(d) heating said feedstock, said additive and said oxidizing agent in said coking drum such that said vanadium is oxidized to its pentavalent state so that said vanadium reacts with said additive so as to form a water soluble salt while at the same time said sulphur reacts with said additive so as to form a water soluble salt and said feedstock decomposes leaving a mass of coke;

(e) injecting superheated steam into said coking drum so as to hydrolyze said sulphur to form H_2S;

(f) washing said coke with water wherein said water soluble salts are forced into solution; and



(g) separating out said coke substantially free of vanadium and sulphur from said solution.

4,927,525

CATALYTIC REFORMING WITH IMPROVED ZEOLITE CATALYSTS

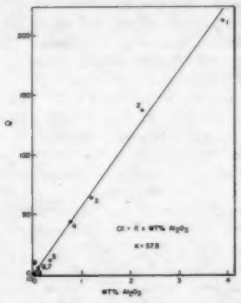
Yung F. Chu, Plainsboro, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 30, 1988, Ser. No. 238,677

The portion of the term of this patent subsequent to May 22, 1990, has been disclaimed.

Int. Cl.[5] C10G *35/06*

U.S. Cl. 208—138 **18 Claims**



1. A method for reforming a naphtha which comprises contacting said naphtha with a noble metal/alkali metal-containing zeolite naphtha reforming catalyst said catalyst containing from about 0.1–1.0 wt % of said noble metal and an amount of said alkali metal which exceeds the cationic exchange capacity of said zeolite, a pressure of from about 0 to about 2000 psig, a temperature of about 750° F. to about 1200° F., a hydrogen to hydrocarbon molar ratio of about 0.1 to 1 to about 15 to 1 and a weight hourly spaced velocity of about 0.5 to about 20, whereby naphtha reforming activity of said catalyst is enhanced by said zeolite resulting in significantly improved C_4^+ gasoline yields.

4,927,526

OCTANE IMPROVEMENT OF GASOLINE IN CATALYTIC CRACKING WITHOUT DECREASING TOTAL LIQUID YIELD

Conroy D. Anderson, Wenonah; Tai-Sheng Chou, Sewell, both of N.J.; William E. Cormier, Jr., Ellicott City, Md.; Francis G. Dwyer, West Chester, Pa.; Frederick J. Krambeck, Cherry Hill, N.J.; Gary M. Pasquale, Lansdale, Pa.; Paul H. Schipper, Wilmington, Del., and William A. Stover, Hampstead, N.C., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 801,103, Nov. 22, 1985, abandoned, and a continuation-in-part of Ser. No. 627,991, Jul. 7, 1984, abandoned, and a continuation-in-part of Ser. No. 628,062, Jul. 8, 1984, abandoned, and a continuation-in-part of Ser. No. 675,375, Nov. 27, 1984, abandoned, and a continuation-in-part of Ser. No. 629,922, Jul. 11, 1984, abandoned. This application Jun. 28, 1988, Ser. No. 187,099

Int. Cl.[5] C10G *11/18*

U.S. Cl. 208—152 **24 Claims**

1. A method of adding ZSM-5 zeolite catalyst to a circulating catalyst inventory of equilibrium catalyst comprising a conventional large pore catalytic cracking catalyst in a catalytic cracking unit in a catalytic cracking operation, in which hydrocarbon feedstock is catalytically cracked to gasoline, which operation includes regeneration of catalyst which has become spent during catalytic cracking wherein said method comprises,

altering said catalyst inventory by adding ZSM-5 incrementally to said catalyst inventory;

ceasing said altering when the equilibrium catalyst contains 1 to 20 wt % of ZSM-5, and continuing said catalytic cracking operation.

4,927,527

METHOD FOR REDUCING OVERCRACKING DURING FCC CATALYST SEPARATION

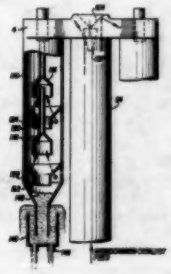
James H. Haddad, Princeton Junction, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 70,663, Jul. 2, 1987, abandoned, which is a continuation of Ser. No. 837,863, Mar. 5, 1986, abandoned, which is a continuation of Ser. No. 632,086, Jul. 18, 1984, abandoned. This application Jan. 3, 1989, Ser. No. 293,543

The portion of the term of this patent subsequent to Aug. 12, 2003, has been disclaimed.

Int. Cl.[5] C10G *35/00*

U.S. Cl. 208—161 **7 Claims**



1. In a method of fluid catalytic cracking of a hydrocarbon feed wherein said feed contacts a source of hot regenerated catalyst in the base of a riser reactor, said feed is cracked in said riser reactor to lighter cracked products and said catalyst is deactivated in said riser, and a mixture of cracked products and deactivated catalyst containing entrained and absorbed hydrocarbons is discharged from said riser reactor, separated into a

gaseous effluent and a separated catalyst stream, said separated catalyst is stripped with a stripping fluid in a catalyst stripper and regenerated in a catalyst regenerator to produce regenerated catalyst, and said regenerated catalyst is recycled to the base of said riser reactor to crack said hydrocarbon feed, the improvement comprising:

separating in a separator connective with said riser reactor a cracked hydrocarbon feed into a gaseous effluent and a separated catalyst;

immediately stripping upon leaving said catalyst separator within a stripper vessel connective with said riser reactor, entrained and absorbed hydrocarbons from catalyst particles in said separated catalyst as said catalyst particles exit said separator;

passing said stripper hydrocarbons to a stripped hydrocarbon exit; and

discharging said stripped catalyst from said stripper vessel through a dipleg extension of said stripper vessel into a catalyst seal pot, said seal pot thereby sealing said dipleg extension, passing between 10 and 90% of said stripped catalyst flowing through said stripper through at least one drain of said seal pot and overflowing a remainder of said stripped catalyst from said seal pot, said seal pot being suspended in an atmosphere of said reactor vessel above a catalyst bed in said reactor vessel.

4,927,528

SIEVE DEVICE FOR SIEVING OUT COMPOST FROM ROTTEN ORGANIC MATERIAL

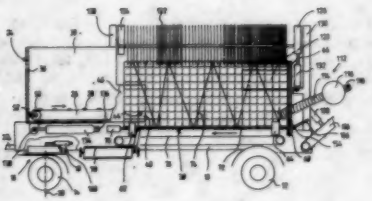
Werner Doppstadt, Vossnacker Strasse 67, 5620 Velbert-Langenberg, Fed. Rep. of Germany

Continuation of Ser. No. 135,663, Dec. 21, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,139

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1986, 3644146

Int. Cl.[5] C05F 9/02

U.S. Cl. 209—240 **36 Claims**



30. Sieve Device for sieving out compost of rotten organic material out of stacks of organic waste comprising:

(a) a filling funnel for feeding organic waste, said filling funnel consisting of a housing having a rectangular filling opening at the top and two opposite sidewalls, one sidewall being vertical and the other sidewall extends obliquely downwards, said two opposite sidewalls being cooperative to prevent said organic waste from forming bridges in said filling funnel, a first conveyer belt running on the bottom of said housing for conveying organic waste dropping thereon from said housing and for turning elongated objects in organic waste to extend substantially longitudinally of said conveyer belt, and servomotor means for slidingly guiding the filling funnel in a direction parallel to the axis of the sieve drum, including means for guiding the funnel so that the conveyer belt is completely retracted from the sieve drum,

(b) a sieve drum open at both ends, the axis of said sieve drum extending parallel to the conveying direction of said first conveyer belt, the first conveyer belt, in operation, projecting on one side thereof, into said sieve drum, said sieve drum being rotatably mounted on freely rotatable rollers to permit unobstructed passage of bulky components of organic waste,

(c) (i) sieve drum driving means comprising toothing arranged to impart to the sieve drum rotary movement about its axis, (ii) said toothing being engaged by a motor-driven toothed wheel arranged to impart to the sieve drum rotary movement about its axis even when heavy parts from organic waste are supplied to said sieve drum,

(d) means for transporting organic waste along the sieve drum from one side to the opposite other side during said rotary movement,

(e) a second conveyer belt running below the sieve drum for carrying out earth falling through the sieve drum, and

(f) means for carrying out elements of organic waste retained by the sieve drum.

4,927,529

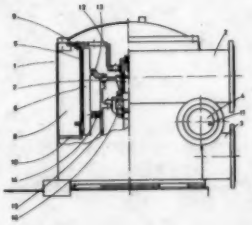
METHOD AND APPARATUS FOR SEPARATING KNOTS

Kaj O. Henricson, Kotka; Erkki T. Repo, Lappeenranta, and Hannu U. Rönkönharju, Kyminlinna, all of Finland, assignors to A. Ahlstrom Corporation

Filed Jan. 19, 1988, Ser. No. 145,557

Int. Cl.[5] B07B 1/22

U.S. Cl. 209—270 **10 Claims**



1. A method of separating knots and other solids from a pulp fibre suspension in an apparatus having an upwardly extending outer housing, an upwardly extending screen cylinder having an interior and mounted for rotation within and spaced inwardly from said outer housing and forming an annular space therebetween, said screen cylinder having a contoured outer surface facing the annular space with openings therethrough between the annular space and the interior of the screen cylinder, and at least one blade arranged within the interior of and adjacent said screen cylinder for subjecting said screen cylinder to pressure pulses, comprising the steps of

rotating said screen cylinder at a rotational speed;

flowing the fibre suspension to be treated into the apparatus directly into the annular space tangentially to the outer surface of said screen cylinder in the direction of rotation of said screen cylinder at a feed speed less than the rotational speed of the screen cylinder for utilizing the feed speed in carrying out the method;

increasing the feed speed of the fibre suspension by the rotational speed of the screen cylinder and thereby effecting a slight fluidization at the contoured outer surface of the screen cylinder and facilitating the centrifugal separation of knots;

positioning the at least one blade in the range of $\pm 10°$ to 45° relative to one of an input connection and a reject connection;

flowing an accept of the suspension directly through the screen cylinder into the interior of the screen cylinder flowing in the direction of rotation of the screen cylinder and discharging the accept tangentially from the interior of the screen cylinder in the direction of the rotation of the screen cylinder;

discharging a reject of said suspension from the annular space tangentially of the outer surface of said screen cylin-

der and in the rotational direction of the screen cylinder and facilitating the discharge of the reject by the rotational speed of the screen cylinder; and

subjecting pressure pulses to the screen cylinder from within the screen cylinder for loosening and displacing fibre stuck in the openings of said screen cylinder.

4,927,530

APPARATUS FOR PROCESSING SLUDGE

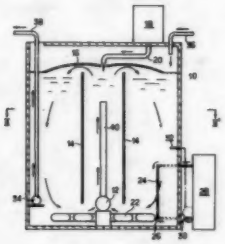
Iwao Ueda, 416, Nanba-cho, Matsubara-sagaru, Nishikiyama-chi-dori, Shimogyo-ku, Kyoto, Japan, assignor to Iwao Ueda; Chie Ueda and Etsuko Ueda, all of, Japan

Filed Apr. 28, 1988, Ser. No. 187,634

Claims priority, application Japan, Apr. 30, 1987, 62-107534

Int. Cl.[5] C02F *11/04*

U.S. Cl. 210—149 **9 Claims**



1. A sludge processing apparatus, comprising: a processing tank, in which a quantity of sludge flowing in through a sludge inflow pipe is deposited and processed;

submersible pump means, located centrally at the bottom in the processing tank, for taking in the sludge from the bottom of the processing tank and spouting it upward to the upper surface of the quantity of deposited sludge;

a circulation guide plate, which circulates the sludge spouted upward by the submersible pump throughout the whole processing tank;

chemical providing means, which feeds to the processing tank a quantity of a chemical for promoting activity of anaerobic bacteria carrying out anaerobic digestion of the sludge;

heating medium means, providing a heating medium and circulating the same through a heating pipe disposed inside said processing tank to heat the sludge;

temperature control means for controlling the temperature of the sludge in the processing tank to be within a predetermined temperature range; and

drain pump means for pumping supernatant water that is left after processing of the sludge out of the processing tank through a drain pipe.

4,927,531

AXIALLY ADJUSTABLE-TYPE COLUMN DEVICE

Kiyoaki Sakamoto, Hofu; Kenichi Matsubara, Shinnanyo; Yasuhiro Nakahara, Yamaguchi, and Masaki Nomura, Tokuyama, all of Japan, assignors to Tosoh Corporation, Shinnanyo, Japan

Filed Feb. 27, 1989, Ser. No. 315,857

Claims priority, application Japan, Feb. 25, 1988, 63-43003

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—198.2 **2 Claims**

2. An axially adjustable-type column device for liquid chromatography, comprising:

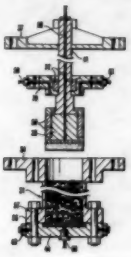
a cylindrical column to be packed with a gel;

a lower partition member in said column;

an upper partition member connected to a plug movably fittable in said column above said lower partition member to form a fluid tight gel bed section therebetween;

liquid supply means for supplying a pressurized liquid to said gel bed section through one of said lower and upper partition members and for permitting a discharge of the liquid from said gel bed section through the other of said lower and upper partition members;

means for forming a pressure balance chamber above said plug;



means including a constant flow pump for applying the pressure of the pressurized liquid to said pressure balance chamber, whereby the pressure in said pressure balance chamber varies as a function of the liquid flowing through said gel bed section so that said upper partition may move downwardly in response to a downward movement of an upper surface of a gel bed in said gel bed section during a column packing operation, and

means for locking the position of said plug, whereby said upper partition member may be locked in place during a separation operation.

4,927,532

DEVICE FOR THE COMPENSATION OF THE BASELINE DRIFT OF A CHROMATOGRAPHIC SEPARATING COLUMN

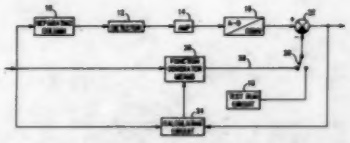
Peter Pospisil, Überlingen, and Bruno Kolb, Owingen, both of Fed. Rep. of Germany, assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 623,884, Jun. 25, 1984, abandoned. This application Jan. 31, 1989, Ser. No. 304,865

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1983, 3323744

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—198.2 **2 Claims**



1. Device for the compensation of the baseline drift of a chromatographic separating column during a temperature and/or flow program, comprising,

(a) a separating column,

(b) programmer means, which are arranged to subject the separating column to predeterminable temperature and/or flowing programs,

(c) test run means for providing a first temperature and/or flow program without sample feeding for determination

of a baseline depending on the temperature and on the flow and characteristic for the separating column,

(d) a memory arranged to memorize data of the baseline thus determined, and

(e) difference forming means, to which, during the subsequent execution of a second temperature and/or flow program with sample feeding and with the same separating column,

a measuring signal corresponding to the output of the separating column and

a baseline signal obtained from the memorized data for correction of the measuring signal are adapted to be applied, comprising,

(i) computer means,

to which the program parameters of the first temperature and/or flow program are applied by the test run means, and

to which the uncorrected baseline signal obtained with this temperature and/or flow program without sample feeding is applied, and

which are arranged to calculate parameters, a, b, τ, Io, specific for the separating column of the analytic function of known form which represents the course of the baseline signal, and

(ii) function generator means,

to which the parameters a, b, τ, Io specific for the separating column and calculated by the computer means are adapted to be applied, and which are arranged to illustrate the baseline signal as said analytic function of time t of the program parameters θ_1, θ_2, θ_3, t_1, t_2, t_3, R_1, R_2, of the temperature and/or flow program determined by the program supply means and of the parameters a, b, τ, Io, specific for the separating column, and

(f) means for correcting said measuring signal with said computed baseline signal

wherein:

a, b are columns specific constants;

τ is a time constant;

θ, θ_2, and θ_3 are column temperatures;

t_1, t_2, and t_3 are times; and

R_1 and R_2 are increase rates.

4,927,533

WATER DEIONIZING APPARATUS

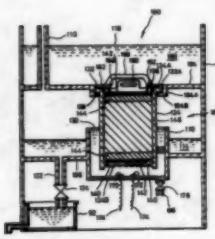
Haruo Takase; Kazushige Uenaka, both of Tokyo; Akira Abe, and Yoshihiro Fujita, both of Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 155,454, Feb. 12, 1988, Pat. No. 4,857,950. This application May 26, 1989, Ser. No. 358,289

Claims priority, application Japan, Feb. 13, 1987, 62-30782; Feb. 14, 1987, 62-32184

Int. Cl.[5] C02F *1/42*

U.S. Cl. 210—257.1 **5 Claims**



1. A water deionizing apparatus for deionizing and purifying water comprising:

a first chamber for storing water therein having an opening in a bottom portion thereof;

a second chamber for storing deionized water therein;

a water deionizing unit removably disposed in said opening between said first and second chamber through which said water is deionized and purified, said deionizing unit having its water entrance sunk in said water in said first chamber and its deionized water exit sunk in said deionized water in said second chamber; and

a removable holding cover for holding down said deionizing unit in said opening, said holding cover having a through opening therein to allow water to enter said water entrance of said deionizing unit.

4,927,534

SCREEN SYSTEM

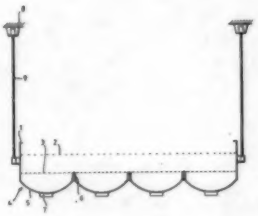
Antti Riihimäki, Noormarkku, Finland, assignor to Rauma-Repola Oy, Finland

Filed Mar. 10, 1989, Ser. No. 321,311

Claims priority, application Finland, Mar. 30, 1988, 881494

Int. Cl.[5] B07B *1/46*

U.S. Cl. 209—315 **3 Claims**



1. A screen system for the screening of wood chips, comprising:

a plurality of screening faces placed one above the other;

a bottom face having sides and a middle portion placed underneath said screening faces;

support means for supporting said bottom face;

vibrating means operatively connected to said screening faces for producing a screening movement;

the bottom face being made of a flexible material and is displaceable during the screening relative to its support means; and

said support means being operatively connected to the vibrating means so that the support means are moved and the bottom face is deformed by the vibrating means during the screening movement whereby the adherence of materials on the bottom face is prevented.

4,927,535

MICROPOROUS MEMBRANES FROM ISOTACTIC POLYSTYRENE AND SYNDIOTACTIC POLYSTYRENE

Henry N. Beck, Walnut Creek, and Robert D. Mahoney, Danville, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 14, 1989, Ser. No. 380,845

Int. Cl.[5] B01D *13/01*

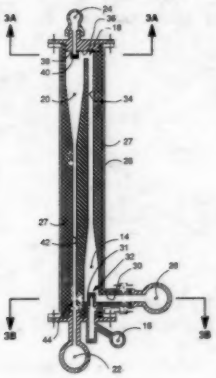
U.S. Cl. 210—500.23 **8 Claims**

1. A semi-permeable membrane comprising a thin isotropic or anisotropic microporous membrane consisting essentially of a mixture of isotactic polystyrene and syndiotactic polystyrene, wherein the ratio of isotactic polystyrene to syndiotactic polystyrene is such as to provide said membrane with properties sufficient for maintaining structural integrity under conditions of ultrafiltration and/or microfiltration.

4,927,536
HYDROCYCLONE SEPARATION SYSTEM

J. Robert Worrell, Tulsa; William D. Wakley, Broken Arrow, and Grant A. Young, Tulsa, all of Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Mar. 21, 1989, Ser. No. 326,351
Int. Cl.[5] B01D *17/038;* B04C *5/28*
U.S. Cl. 210—512.2 3 Claims



1. A hydrocyclone separation system for separating a fluid mixture into at least two components having differing densities, comprising:

a first hydrocyclone separator and a second hydrocyclone separator contained within an elongated protective conduit and each being substantially parallel to a longitudinal axis of the conduit, each hydrocyclone separator having a tangential fluid inlet, an overflow fluid outlet and an underflow fluid outlet;

the first hydrocyclone separator and the second hydrocyclone separator being oppositely disposed with respect to each other with the underflow fluid outlet of the first hydrocyclone separator being spaced immediately adjacent to the tangential fluid inlet of the second hydrocyclone separator and the overflow fluid outlet of the first hydrocyclone separator being spaced immediately adjacent the underflow fluid outlet of the second hydrocyclone separator; and

a curved flow direction conduit extending tangentially from the underflow fluid outlet of the first hydrocyclone separator to the tangential fluid inlet of the second hydrocyclone separator to preclude remixing of differing density components.

4,927,537
TAPE DRIVE WITH SELF-EXPANDING COILS FOR SLUDGE COLLECTOR

Charles L. Meurer, Golden, Colo., assignor to Envirotech Corporation, Salt Lake City, Utah

Filed Mar. 9, 1989, Ser. No. 321,440
Int. Cl.[5] B01D *21/20;* F16H *29/02;* B66D *1/26*
U.S. Cl. 210—527 4 Claims

1. An apparatus for taking up and paying out opposite first and second ends of loop of a metal tape, said tape having an intermediate section, comprising:

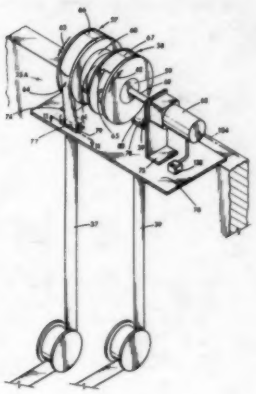
first reel means connected to said first end for carrying a first coil of said tape, said first coil extending from said first reel means and being self-expanding so as to unwind itself from said first reel means;

second reel means connected to said second end for carrying a second coil of said tape, said second coil extending from said second reel means and being self-expanding so as to unwind itself from said second reel means;

common means connected to both said first and second reel means for supporting both said first and second reel means for rotation in the same direction;

means for guiding said intermediate section of said tape from said first reel means to said second reel means; and

means for rotating said supporting means in a first rotary direction so that said first coil tends to unwind from said first reel means and said second coil is wound up on said second reel means to move said intermediate section of said tape toward said second reel means and to draw said tape from said first coil, said rotating means being effective to rotate said supporting means in a second rotary direction so that said second coil tends to unwind from said second reel means and said first coil is wound up on said first reel means to move said intermediate section of said tape toward said first reel means and to draw said tape from said second coil.



4,927,538
PURIFICATION OF C.I. SOLVENT BLACK 3

Hisashi Senshu, Machida, and Masahiro Otsuka, Osaka, both of Japan, assignors to Orient Chemical Industries, Ltd., Osaka, Japan

Filed Apr. 28, 1989, Ser. No. 344,372
Claims priority, application Japan, May 6, 1988, 63-110978
Int. Cl.[5] B01D *11/04*
U.S. Cl. 210—634 8 Claims

1. A process for purifying C.I. Solvent Black 3 comprising dissolving C.I. Solvent Black 3 in an organic solvent selected from the group consisting of aromatic hydrocarbons having 6 to 12 carbon atoms, petroleum hydrocarbons having 6 to 10 carbon atoms and mixtures thereof to form a solution, filtering said solution, and removing said solvent from the filtrate resulting from the filtering.

4,927,539

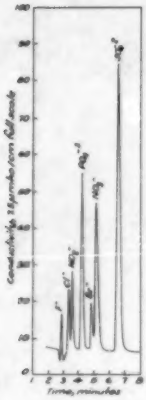
HIGH PERFORMANCE ANION-EXCHANGE CHROMATOGRAPHIC PACKING COMPOSITION CONSISTING OF LOW POROSITY SYNTHETIC RESIN GEL PARTICLE SUBSTRATE COATED WITH LIQUID WATER-SOLUBLE AMINATED RESIN

Timothy S. Stevens; Martin A. Langhorst, and Ouro W. Randall, III, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 490,268, May 2, 1983, abandoned. This application Oct. 24, 1988, Ser. No. 262,074

Int. Cl.[5] B01D *15/08*; C08D *5/20*

U.S. Cl. 210—635 **6 Claims**



1. A chromatographic analytical column, the column containing a packed bed of an anion-exchange chromatographic packing which comprises:

a substrate which consists essentially of insoluble synthetic resin particles of the low porosity gel type, having cation-exchanging sites at least on their available surfaces, the particles being of a diameter of between 1 to about 75 microns; and

a chromatographically active anion-exchange liquid coating irreversibly attached to the available surfaces of the substrate particles, the liquid coating consisting essentially of hydrophilic, water soluble, film forming aminated resin having anion-exchanging sites which attract available cation-exchanging sites of the substrate, wherein the liquid coating is retained by electrostatic bonds on the available surfaces of the substrate particles.

4,927,540

IONIC COMPLEX FOR ENHANCING PERFORMANCE OF WATER TREATMENT MEMBRANES

Ritchie A. Wessling, Midland; Sharon S. Whipple, Sanford, and Richard F. Fibiger, Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 903,640, Sep. 4, 1986, abandoned. This application Apr. 19, 1988, Ser. No. 185,323

Int. Cl.[5] B01D *13/00, 13/01*

U.S. Cl. 210—638 **17 Claims**

1. An improved reverse osmosis membrane comprising a semipermeable reverse osmosis membrane having a first discriminating layer as a supporting surface and affixed to the supporting surface is a second thin film layer comprising an ionic complex of a first compound bearing at least one quaternary ammonium, imidazolinium or pyridinium group and a second compound bearing at least one carboxylate, phosphonate or sulfonate group, with the proviso that at least one of the first and second compounds is a polymer or prepolymer and also bears an average of more than one ionic group per molecule.

4,927,541

PROCESS FOR REFINING AMINO ACIDS

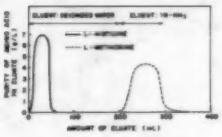
Masaaki Matsuda, and Yuji Yoshida, both of Osaka, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 3, 1989, Ser. No. 332,172

Claims priority, application Japan, Apr. 8, 1988, 63-87551

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—656 **6 Claims**



1. A process for separating and refining a first amino acid away from at least one other amino acid, which process comprises:

(i) contacting a chelate resin having aminocarboxylic acid groups or aminophosphonic acid groups coordinated with metal ions, with an aqueous solution containing said first amino acid and said at least one other amino acid under conditions such that said first amino acid and said at least one other amino acid are adsorbed on said chelate resin, and

(ii) successively eluting said first amino acid and said at least one other amino acid from said chelate resin with an eluent.

4,927,542

ELIMINATION OF HYDROXYLAMMONIUM SALTS FROM WASTEWATERS CONTAINING SUCH SALTS

Hugo Fuchs, Lugwigshafen, and David Agar, Rimbach, both of Fed. Rep. of Germany, assignors to BASF Aktiengeseilschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 19, 1989, Ser. No. 410,044

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1988, 3834030

Int. Cl.[5] C02F *1/58*

U.S. Cl. 210—711 **4 Claims**

1. A process for eliminating hydroxylammonium salts from wastewaters containing such salts, which comprises treating a wastewater containing hydroxylammonium salts with not less than 0.5 mole of manganese(IV) oxides per mole of hydroxylamine in the form of hydroxylammonium salts at a pH of from 1 to 4 and at from 10 to 100° C.

4,927,543

METHOD AND INSTALLATION FOR TREATING LIQUID BY SEDIMENTATION USING FINE SAND

Guy P. Bablon, Feliceroiles, and Gilbert Desbos, Maisons Laffitte, both of France, assignors to Omnium de Traitements et de Valorisation (OTV), Cedex, France

Filed Feb. 14, 1989, Ser. No. 310,204

Claims priority, application France, Feb. 25, 1988, 88 02288

Int. Cl.[5] B01D *21/08*

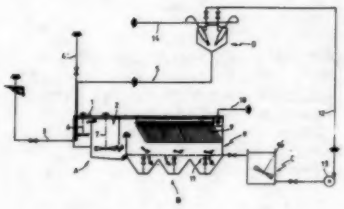
U.S. Cl. 210—711 **20 Claims**

1. A method for liquid treatment by sedimentation comprising the steps of:

injecting reagents into a flow of untreated liquid and creating in said flow a colloid mixing and destabilization area where said flow is made turbulent and where insoluble

granular material denser than said liquid is injected into said liquid in predetermined proportions;

passing said liquid flow with said insoluble granular material into an intermediate colloid aggregation area where turbulence is induced to maintain said insoluble granular material in suspension,



passing said turbulent liquid flow together with substantially all of said granular material into a sedimentation area equipped with separator plates and removing clarified liquid from said separator plates; and

removing from the sedimentation area sludge formed therein including said insoluble granular material, recovering said insoluble granular material from said sludge, and cleaning and recycling said granular material.

4,927,544

PROCESS FOR THE CONTINUOUS REMOVAL OF A GUM PHASE FROM TRIGLYCERIDE OIL

Martin van Opstal, Izegem; Frans Dewulf, Lauwe; Bernard Cleenewerck, Wachtebeke, all of Belgium, and Ernst Weber, Oelde, Fed. Rep. of Germany, assignors to N.V. Vandemoortele International, Kortrijk, Belgium

Filed Mar. 14, 1989, Ser. No. 322,860

Claims priority, application European Pat. Off., Jul. 6, 1988, 88110751.0

Int. Cl.[5] B01D *21/26*

U.S. Cl. 210—712 **8 Claims**

1. A process for the continuous removal of a gum phase from triglyceride oil comprising the following stages:

(a) in a first stage the oil containing a separate gum phase is subjected to centrifugal separation in a first centrifugal separator to yield gums with low oil content and an oil that still contains a fraction of the gums originally present in the feed;

(b) in a second stage the oil obtained from stage (a) is subjected to centrifugal separation in a second centrifugal separator to yield oil with a further reduced residual gum content and a gum phase with a higher oil content than the gums obtained in stage (a);

(c) in a third stage the gum phase obtained in stage (b) is recycled into the oil stream fed to the first centrifugal separator; and

(d) optionally in a fourth stage the oil obtained in stage (b) is washed one or more times with water.

4,927,545

METHOD AND APPARATUS FOR AUTOMATIC PROCESSING AND ANALYZING OF BLOOD SERUM

Edward T. Roginski, Hamtramck, Mich., assignor to Medical Automation Specialties, Inc., Detroit, Mich.

Filed Oct. 6, 1988, Ser. No. 254,420

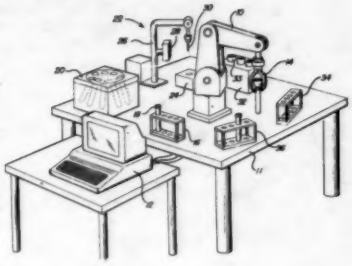
Int. Cl.[5] B01D *21/26*

U.S. Cl. 210—745 **17 Claims**

1. The method of inspecting centrifuged test tubes containing whole blood and separator wax, that have been centrifuged to produce separation of the blood into red cells and serum, comprising:

moving the test tube into an optical sensing unit having at least one light beam extending generally normally to the longitudinal axis of the tube;

positioning at least one photosensor in said optical sensing unit to receive the light beam transmitted through the tube; and



analyzing electrical signals generated by the photosensor to: (a) evaluate the success of the separation; and (b) determine the position of the boundary surface between the separator wax and the blood serum.

4,927,546

METHOD FOR INHIBITING GROWTH OF ALGAE IN RECREATIONAL WATER

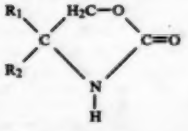
Charles R. Wiedrich, Wadsworth, Ohio, and Edward J. Sare, Berkeley Heights, N.J., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 28, 1988, Ser. No. 276,728

Int. Cl.[5] C02F *1/76*

U.S. Cl. 210—755 **11 Claims**

1. A method for inhibiting the growth of algae in a stored body of water in the absence of algicidal amounts of free available halogen, which comprises providing in said body of water from about 0.05 to 4.5 ppm of a 2-oxazolidinone and a sufficient amount of a source of halogen to provide from about 0.03 to about 2.8 ppm respectively of combined available halogen based on the corresponding halogen-containing, 2-oxazolidinone, said halogen being selected from the group consisting of chlorine and bromine, said 2-oxazolidinone being represented by the graphic formula:



wherein R_1 is a C_1–C_4 alkyl; R_2 is selected from the group consisting of C_1–C_4 alkyl, hydroxy, hydroxymethyl, C_1–C_4 alkoxy and —Ph—R, wherein Ph is phenylene and R is selected from the group consisting of C_1–C_4 alkyl, C_1–C_4 alkoxy and hydroxy.

4,927,547

METHOD OF FILTERING THE EFFLUENT FROM A WIRE EDM PROCESS

Sune Backman, Götavägen 10B, Djursholm S-182 61, Sweden

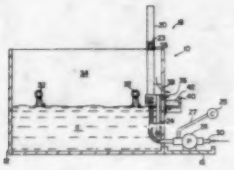
Filed Oct. 26, 1988, Ser. No. 262,775

Int. Cl.[5] B01D *23/24*

U.S. Cl. 210—771 **16 Claims**

1. A method for removing impurities from a liquid-solid effluent generated in an electric discharge machining process, said method comprising the steps of:

(a) providing at least one filter apparatus, comprising at least one filtering means for separating at least a portion of said impurities from said effluent, said filter apparatus being oriented in an operating position wherein said filtering means is at least partially immersed in said effluent, and said filter apparatus being mounted for movement between said operating position and a cleaning position in which said filtering means is not immersed in said effluent;
(b) providing said effluent from said electric discharge machining process to said filter apparatus;



(c) filtering at least a portion of said impurities from said effluent by drawing at least a portion of said effluent, in a filtering direction, through said filtering means, thereby forming a liquid filtrate;
(d) moving said filter apparatus to said cleaning position; and
(e) backflushing a medium, comprising said liquid filtrate, through said filtering means in a cleaning direction which is opposite to said filtering direction, said backflushing being conducted at an elevated pressure greater than atmospheric pressure, thereby removing at least a portion of the impurities from said filtering means.

4,927,548

PROCESS FOR THE PRODUCTION OF BASIC SOAPS OF DIVALENT METALS IN POWDER FORM

Albrecht Hirsch, Bremerhaven, and Erwin Fleischer, Schiffdorf, both of Fed. Rep. of Germany, assignors to Neynaber Chemie GmbH, Loxstedt, Fed. Rep. of Germany

Filed Feb. 27, 1989, Ser. No. 315,963

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1988, 3806192

Int. Cl.[5] C10M *129/26*

U.S. Cl. 252—17 **7 Claims**

1. A process for the production of powdered basic metal soaps having a composition corresponding to the formula $(MO)_n$-$M(RCOO)_2$, wherein MO represents a metal oxide selected from the group consisting of CaO, ZnO, MgO, BaO, and PbO, or a mixed oxide selected from the group consisting of PbO/CaO, CaO/ZnO, BaO/CdO, and BaO/ZnO; M represents a divalent metal cation or mixture of metal cations corresponding to the metal content of MO; the group RCOO represents the anions of a fatty acid containing 8 to 34 carbon atoms or of a mixture of such fatty acids; and n has a value of 0.2 to 2; said process comprising mechanically mixing in a reactor:
(a) powdered solid fatty acids having the formula RCOOH, in which RCOO is as defined above;
(b) powdered metal oxides or metal oxide mixtures having the formula MO, or the corresponding powdered metal hydroxides or metal hydroxide mixtures; and
(c) a component selected from the group consisting of:
(i) about 0.1 to about 5% by weight of water, ethanol, or a mixture of water and ethanol;
(ii) about 0.1 to about 1% by weight of a secondary acid having a first ionization product constant of at least 10^{-5}; and
(iii) both (i) and (ii),
said % by weight being referred to the combined total weight of components (a), (b), and (c) of the mixture;
the relative amounts of components (a) and (b) being such as to provide after reaction the proper stoichiometric amounts corresponding to said formula $(MO)_n$-$M(RCOO)_2$; said mixing being performed at a temperature between ambient temperature and about 100° C. and under a pressure not greater than the ambient pressure; the reaction mixture being present in the form of discrete, free-flowing particles throughout the entire process.

4,927,549

LUBRICANT OF LUBRICATING OIL BASIS FOR LUBRICATING ROTATING AND/OR SLIDING SURFACES AND PROCESS FOR PREPARING SAME

József Harsányi, Budapest; László Kohányi, Százhalombatta; Károly Domsa, Budapest; Lajos Szakács, Budapest; Géza Szentgyörgyi, Budapest, and Aladár Imre, Budapest, all of Hungary, assignors to Egis Gyogyszergyar, Budapest, Hungary

Filed Jun. 9, 1988, Ser. No. 204,254

Int. Cl.[5] C10M *125/10*

U.S. Cl. 252—25 **6 Claims**

1. Lubricant of lubricating oil basis for lubricating rotating and/or sliding surfaces, which comprises, beside the usual additives of lubricating oils, 0.01 to 0.3 g/l of aluminium oxide powder consisting of particles of 0.1 to 4 μm in size.

4,927,550

CORROSION PREVENTIVE COMPOSITION

John A. Cutcher, Westmont, and Gary M. Andrews, Chicago Ridge, both of Ill., assignors to Castrol Industrial Inc., Chicago, Ill.

Filed Jan. 27, 1989, Ser. No. 302,478

Int. Cl.[5] C10M *137/02, 129/40*

U.S. Cl. 252—32.5 **58 Claims**

1. An aqueous alkaline metalworking fluid composition in the form of a concentrate comprising:
a salt of orthophosphoric acid;
a dibasicdioic acid in an amount of up to about 5.0% by weight of the concentrate;
a chelating agent; and,
a neutralizing base,
said composition being essentially free of phosphates.

4,927,551

LUBRICATING OIL COMPOSITIONS CONTAINING A COMBINATION OF A MODIFIED SUCCINIMIDE AND A GROUP II METAL OVERBASED SULFURIZED ALKYLPHENOL

Timothy R. Erdman; Michael A. Shippey, and Robert H. Wollenberg, all of San Rafael, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 139,513, Dec. 30, 1987, abandoned, which is a continuation of Ser. No. 921,719, Oct. 21, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 339,465

The portion of the term of this patent subsequent to Sep. 16, 2003, has been disclaimed.

Int. Cl.[5] C10M *141/06, 133/44*

U.S. Cl. 252—42.7 **10 Claims**

1. A lubricating oil composition comprising an oil of lubricating viscosity and (a) from about 0.2 to about 10 percent by weight of a polyamino alkenyl or alkyl succinimide wherein one or more of the nitrogens of the polyamino moiety is substituted with a hydroxyhydrocarbyl oxycarbonyl group wherein the hydroxyhydrocarbyl oxycarbonyl group contains from 2 to 20 carbon atoms and 1 to 6 hydroxy groups with the proviso that there is no hydroxy substitution on the hydrocarbyl carbon atom attaching the hydroxyhydrocarbyl group to the oxy atom of the oxycarbonyl group and with the further proviso that when more than one hydroxy group is contained in the hydroxyhydrocarbyl group, no more than one hydroxy is attached to the same carbon atom and the number of carbon atoms in the hydroxyhydrocarbyl group is minimally one

greater than the number of hydroxy groups; and (b) from about 0.5 to about 40 percent by weight of a Group II metal overbased sulfurized alkylphenol.

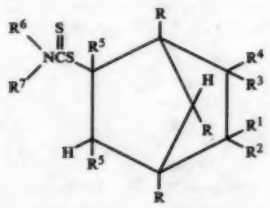
4,927,552

LUBRICATING OIL COMPOSITION

William Y. Lam, Ballwin, Mo., assignor to Ethyl Petroleum Additives, Inc., St. Louis, Mo.

Division of Ser. No. 189,101, May 2, 1988, Pat. No. 4,876,375. This application Jul. 17, 1989, Ser. No. 380,464
The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.
Int. Cl.[5] C10M *135/18*
U.S. Cl. 252—47 9 Claims

1. A lubricating composition containing a major amount of lubricating oil and a minor antiwear-antioxidant amount of an additive compound having the general formula:



(A)

wherein:

a. each of R, R^2 and R^4 when taken singly is a hydrogen atom, an alikyl group containing from 1 to about 15 carbon atoms, an aryl group containing from 6 to about 15 carbon atoms or a cycloalkyl group containing from 4 to about 10 carbon atoms;

b. each of R^1 and R^3 when taken singly is a hydrogen atom, an alkyl group containing from 1 to about 15 carbon atoms; an aryl group containing from 6 to about 15 carbon atoms; a cycloalkyl group containing from 4 to about 10 carbon atoms or an alkenyl group containing from 2 to about 10 carbon atoms or R^1 and R^3 taken together form the group —CHYCY=CY— in which Y is a hydrogen atom or a methyl group or R^1 together with R^2 form an alkylidene group containing from 1 to about 6 carbon atoms;

c. R^5 is a hydrogen atom or an alkyl group containing from 1 to about 15 carbon atoms;

d. R^6 is an organic radical selected from an alkyl group, an alkenyl group, an aryl group or an aralkyl group in which the alkyl or alkenyl groups contain up to 32 carbon atoms and the aryl or aralkyl groups contain up to 15 carbon atoms each; and

e. R^7 is hydrogen or an organic radical selected from an alkyl group or alkenyl group, an aryl or aralkyl group in which the alkyl or alkenyl groups contain up to 32 carbon atoms and the aryl or aralkyl groups contain up to 15 carbon atoms each.

4,927,553

HAZE-FREE BORONATED ANTIOXIDANT

William E. Wright, Farmington Hills; Bryan T. Davis, West Bloomfield, both of Mich.; Donald S. Matteson, Moscow, Id., and Gordon G. Knapp, Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed May 6, 1983, Ser. No. 492,354
Int. Cl.[5] C10M *141/02*
U.S. Cl. 252—49.6 3 Claims

1. A hydrolytically stable additive composition comprising about 75–99.5 parts by weight of a boronated phenolic antioxidant which is a mixture of about 0–50 weight percent 4,4'-methylenebis(2,6-di-tert-butylphenol); about 10–75 weight percent 4,4'-methylenebis(2,6-di-tert-butylphenol)-di-(di-sec-butyl orthoborate); and about 25–75 weight percent 4,4'-methylenebis(2,6-di-tert-butylphenol)-mono-(di-sec-butyl orthoborate), said boronated phenolic antioxidant being subject to hydrolysis in the presence of moisture and, to prevent or correct haze or film formation in said boronate phenolic antioxidant due to said hydrolysis, about 0.5–25 parts by weight of pinane diol or pinacol.

4,927,554

LIQUID COMPOSITIONS CONTAINING ORGANIC SULFONES AND SULFOXIDES

Scott T. Jolley, Mentor, and Mary F. Salomon, Cleveland Hts., both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Nov. 10, 1988, Ser. No. 269,622
Int. Cl.[5] C09K *5/00*; C10M *105/72*, *135/08*
U.S. Cl. 252—68 14 Claims

1. A liquid composition comprising

(A) a major amount of a fluorine containing hydrocarbon containing one or two carbon atoms, and

(B) a minor amount of a soluble organic lubricant free of acetylenic and aromatic unsaturation and comprising at least one sulfone or sulfoxide characterized by the formulae

$$R^1(R^2)SO_2 \quad (I)$$

$$R^1(R^2)SO \quad (II)$$

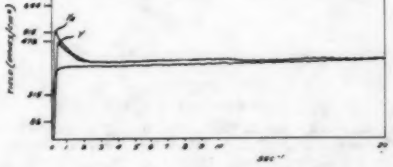
wherein R^1 and R^2 are each independently hydrocarbyl groups, $—R^3O(O)CR^4$, $—NR^4R^5$ or $—R^3NR^4R^5$ groups wherein R^3 is a hydrocarbylene group, and R^4 and R^5 are each independently hydrocarbyl groups, or R^1 and R^2 are hydrocarbylene groups joined together to form a cyclic moiety including the sulfur atom, or R^1 is a hydrocarbyl group and R^2 is OR^6 wherein R^6 is a hydrocarbyl group.

4,927,555

PROCESS FOR MAKING THIXOTROPIC DETERGENT COMPOSITIONS

Remo J. Colarusso, Jr., Wayne, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 928,736, Nov. 10, 1986, abandoned, which is a continuation of Ser. No. 640,484, Aug. 13, 1984, abandoned. This application Jul. 26, 1988, Ser. No. 225,617
Int. Cl.[5] C11D *1/24*
U.S. Cl. 252—99 18 Claims



1. A process for making an aqueous thixotropic dishwasher detergent composition comprising by weight:

(a) 8 to 35% alkali metal tripolyphosphate,

(b) 2.5 to 20% alkali metal silicate,

(c) 0 to 9% alkali metal carbonate,

(d) 0.1 to 5% chlorine bleach stable, water dispersible organic detergent active material,

(e) 0 to 5% chlorine bleach stable foam depressant,

(f) chlorine bleach compound in an amount to provide about 0.2 to 4% of available chlorine,

(g) thixotropic clay thickener in an amount sufficient to

provide the composition with a thixotropy index of about 2.5 to 10.0, and

(h) 40 to 50% water; said process comprising the steps of:

1. mixing water containing dissolved alkali metal carbonate with a sufficient amount of alkali metal tripolyphosphate detergent builder salt to obtain a viscous mixture having a viscosity of 20,000 to 60,000 centipoises,
2. subjecting said viscous mixture to high speed dispersing to effect wet grinding of said builder salt to a particle size of less than about 40 microns,
3. adding a sufficient amount of water to reduce the viscosity of the wet ground mixture to less than 10,000 centipoises,
4. high speed dispersing said wet ground mixture while adding powdered clay thickener to obtain a homogeneous and smooth viscous mixture, and
5. adding to the smooth viscous mixture the remaining ingredients so as to produce the thixotropic detergent composition.

4,927,556

AQUEOUS BASED COMPOSITION CONTAINING DIBASIC ESTER AND THICKENING AGENT FOR REMOVING COATINGS

Richard J. Pokorny, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation-in-part of Ser. No. 164,231, Mar. 18, 1988, abandoned, which is a continuation-in-part of Ser. No. 58,162, Jun. 4, 1987, abandoned. This application Oct. 20, 1988, Ser. No. 260,172

Claims priority, application Australia, Apr. 28, 1988, 15253/88; European Pat. Off., May 11, 1988, 88304241.8; Japan, Jun. 3, 1988, 63-137163; Rep. of Korea, Jun. 3, 1988, 88-6758

Int. Cl.[5] C11D *7/26*

U.S. Cl. 252—173 **18 Claims**

16. A thixotropic emulsion composition consisting essentially of:

(1) at least one dibasic ester in an amount sufficient to render organic polymeric coatings removable from surfaces;

(2) water in an amount exceeding 55 percent by weight of the composition; and

(3) at least one thickening agent selected from the group consisting of water soluble and water swellable thickening agents in an amount sufficient to form a stable thixotropic emulsion having the ability to cling to vertical surfaces.

4,927,557

PROCESS FOR FORMING FLAKES

Jack W. Revis; John A. Sagel, both of Cincinnati, and Daniel I. Ostendorf, West Chester, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 182,265, Apr. 15, 1988, abandoned, which is a continuation-in-part of Ser. No. 46,596, May 5, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 273,692

Int. Cl.[5] C11D *17/06*; B29B *9/04*; B02C *11/02*

U.S. Cl. 252—174.15 **19 Claims**

1. A process for forming solid flakes comprising cooling a thin film of a molten, water-soluble or water dispersible, non-hygroscopic plastic organic material on a belt cooler, the surface of said belt cooler having been wetted by spraying, dripping, or wiping on a thin film of a hydrophilic solvent, so as to improve the rate of cooling and solidification of said organic material.

4,927,558

PROTEOLYTIC DETERGENT ADDITIVE AND COMPOSITIONS CONTAINING THE SAME

Dorrit A. Aaslyng, Roskilde; Georg W. Jensen, Bagsvaerd; Ib Schneider, Hellerup, and Palle Schneider, Ballerup, all of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark

PCT No. PCT/DK87/00145, § 371 Date Aug. 31, 1988, § 102(e) Date Aug. 31, 1988, PCT Pub. No. WO88/03946, PCT Pub. Date Jun. 2, 1988

PCT Filed Nov. 25, 1987, Ser. No. 223,787

Claims priority, application Denmark, Nov. 25, 1986, 5640/86

Int. Cl.[5] C11D *3/386, 7/42*; C12N *9/50, 9/58*

U.S. Cl. 252—174.12 **14 Claims**

1. A proteolytic detergent additive comprising a combination of at least two alkaline proteases, of which one is a protease obtainable from *Bacillus sp.* and one is a fungal or actinomycete protease the Bacillus protease providing from 50 to 95% of the total proteolytic activity CPU in the detergent additive, the detergent additive comprising a non-dusting granulate or a stabilized liquid having a total protease activity from 0.1 to 10 CPU/g.

4,927,559

LOW PERBORATE TO PRECURSOR RATIO BLEACH SYSTEMS

Joshua Schwarz, Brooklyn, N.Y., and Christine Accardi, Lodi, assignors to Lever Brothers Company, New York, N.Y.

Filed Apr. 14, 1988, Ser. No. 181,288

Int. Cl.[5] D06L *3/02*; C11D *3/39*

U.S. Cl. 252—186.39 **6 Claims**

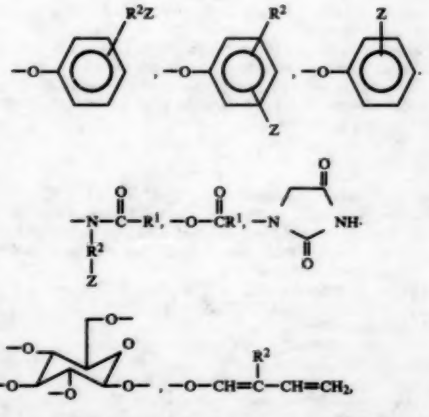
1. A bleaching composition to be added to an aqueous medium comprising:

(i) a peroxygen bleaching compound capable of yielding hydrogen peroxide in said aqueous media; and

(ii) one or more bleach precursors having the general formula:

(I)

wherein R is an aromatic or substituted aromatic radical with a total of 6 to about 18 carbon atoms, L is a leaving group, wherein a conjugate acid of an anion formed on L has a pK_a in the range of from about 4 to about 13; and L is selected from the group consisting of:



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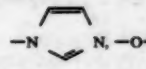


and mixtures thereof; wherein R^1 is an alkyl group containing from 5 to about 17 carbon atoms and wherein R^2 is an alkyl chain containing from about 1 to about 8 carbon atoms, R^3 is H or R^2, and Z is H or a solubilizing group; and

wherein the peroxygen bleaching compound relative to the precursor is present in a molar ratio that ranges from 0.1 to 1, and the pH of the aqueous media ranges from 8.5 to 9.4.

4,927,560

METHOD FOR PRODUCTION OF INORGANIC MINUTE GLOBULAR PARTICLES

Shigemi Osaka; Kazuo Hata, and Tsukasa Takahashi, all of Himeji, Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Feb. 24, 1988, Ser. No. 159,889

Claims priority, application Japan, Feb. 25, 1987, 62-40085; Feb. 27, 1987, 62-42750; Jul. 10, 1987, 62-170868

Int. Cl.[5] C04B *33/00*

U.S. Cl. 252—315.1 **21 Claims**

1. A method of producing inorganic minute globular particles comprising, forming a W/O sol emulsion by mixing (1) at least one metal oxide-containing sol selected from the group consisting of (a) metal oxide sols and (b) mixed sols containing said metal oxide sols and an inorganic compound, an alkoxide, or a sol of at least one other element, with (2) an organic solvent, insoluble or sparingly soluble in water, in the presence of a surfactant; mixing said emulsion with a basic substance or an electrolyte to convert said sol forming the water layer in said emulsion into gel to provide globular gel particles; and subsequently heating said globular gel particles to expel water in said globular gel particles in the form of a mixture thereof with said organic solvent.

4,927,561

MULTIFUNCTIONAL ANTIFOULANT COMPOSITIONS

David R. Forester, The Woodlands, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.

Division of Ser. No. 944,159, Dec. 18, 1986, Pat. No. 4,775,458. This application Jun. 17, 1988, Ser. No. 208,204

The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.

Int. Cl.[5] C23F *11/10*

U.S. Cl. 252—389.22 **22 Claims**

1. Composition for controlling the formation of fouling deposits in a hydrocarbon medium during processing thereof at elevated temperatures comprising:

an ester of a polyalkenylthiophosphonic acid processed via steam hydrolysis and methanol extraction and at least one additional antifouling component selected from the group consisting of:

(1) an effective antioxidant compound or compounds adapted to inhibit oxygen based polymerization of said hydrocarbon medium, selected from the group consisting of: phenylenediamine compounds, substituted phenolic compounds, quinone or derivatives thereof and phenothiazine or derivatives thereof,

(2) a corrosion inhibiting compound or compounds to reduce corrosion of metallic surfaces in contact with said hydrocarbon medium during processing thereof, selected from the group consisting of: tetrahydropyrimidenes, imidazolines, reaction products of alkylene polyamines, aliphatic carboxylic acids and paraformaldehyde, magnesium, calcium or amine sulfonates and reaction products of ethylene oxide or propylene oxide and alkylphenol, and

(3) a metal deactivator compound or compounds adapted to complex with metallic impurities in said hydrocarbon medium selected from the group consisting of: N,N'-disalicylidene-1,2-cyclohexanediamine, 2,5-dimercapto-1,3,4-thiadiazole or derivatives thereof, and Mannich reaction products of alkylphenol, aldehyde and a polyamine.

4,927,562

ELASTOMER-COMPATIBLE OXALIC ACID ACYLATED ALKENYLSUCCINIMIDES

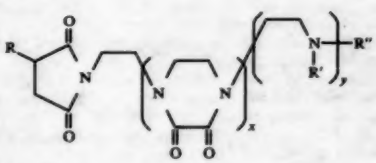
Thomas J. Karol, and Theodore E. Nalesnik, both of Wappingers Falls, N.Y., assignors to Texaco Inc., White Plains, N.Y.

Continuation of Ser. No. 495,295, May 16, 1983, abandoned. This application Oct. 24, 1988, Ser. No. 246,043

Int. Cl.[5] C10M *133/44*; C07D *207/40*

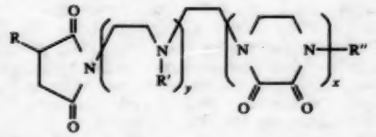
U.S. Cl. 252—51.5 A **14 Claims**

1. A compound of the formula:



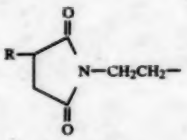
(I)

or



(II)

in which R is a hydrocarbyl radical having from 8 to 400 carbon atoms, "X is a number ranging from 1 to 6, Y is a number ranging from 0 to 6," whose additive total is from 1 to 6, R' is hydrogen or a mono-, or bi-acyl radical of oxalic acid, and R" is a hydrogen or hydrocarbyl substituted succinic-N-ethylene radical of the formula



4,927,563

ANTIDANDRUFF SHAMPOO COMPOSITIONS CONTAINING A MAGNESIUM ALUMINUM SILICATE-XANTHAN GUM SUSPENSION SYSTEM

Patrick C. McCall, Cincinnati, Ohio, assignor to Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 26, 1988, Ser. No. 148,728

Int. Cl.[5] A61K *7/075*

U.S. Cl. 252—551 **7 Claims**

1. A lotion shampoo composition comprising:

(a) from about 10% to about 30% of a synthetic surfactant selected from the group consisting of anionic surfactant, zwitherionic surfactants, amphoteric surfactants and mixtures thereof;

(b) from about 0.1% to about 5.0% of selenium sulfide having an average particle size of less than about 25 μm;

(c) from about 0.02% to about 0.40% of a xanthan gum;

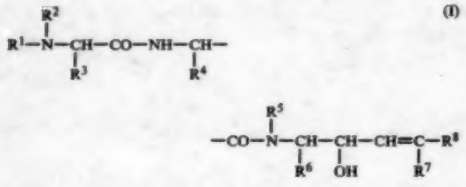
(d) from about 0.5% to about 2.0% of a magnesium aluminum silicate; and
(e) the remainder water.

4,927,564
METHOD FOR CONDITIONING RADIOACTIVE OR TOXIC WASTES IN THERMOSETTING RESINS
André Barlou, La Tour D'Aigues; Alexandre Beltritti, Manosque; Patrick Gramondi, Saint Cannat, and Hugues Vidal, Pertuis, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France
Filed Nov. 17, 1988, Ser. No. 272,716
Claims priority, application France, Nov. 23, 1987, 87 16199
Int. Cl.[5] G21F *9/16*; C08F *8/32*
U.S. Cl. 252—628 **10 Claims**

1. A method for conditioning in a thermosetting resin a quantity of radioactive or toxic waste stored in water, said resin being curable by the liquid hardening agent which is immiscible with water and has a density greater than that of water, comprising the sequential steps of:
(a) addition and mixing of the liquid hardening agent with the waste stored in the water,
(b) decantation of the waste with the liquid hardening agent,
(c) extraction of the water present above the liquid hardener agent in which the waste is transferred, and
(d) mixing of the waste transferred into the liquid hardening agent with the thermosetting resin.

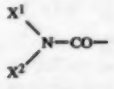
4,927,565
5-SUBSTITUTED AMINO-4-HYDROXY-PENTENOIC ACID DERIVATIVES AND THEIR USE
Seiichi Tanaka, Tokyo; Yutaka Koike, Koshigaya; Masato Nakano, Tokyo; Shugo Atsuumi, Tokyo; Hajime Morishima, Tokyo, and Kenji Matsuyama, Kashiwa, all of Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan
Filed Dec. 16, 1987, Ser. No. 133,642
Claims priority, application Japan, Dec. 19, 1986, 61-301596
Int. Cl.[5] C09F *5/00*, *5/06*
U.S. Cl. 260—404.5 **11 Claims**

1. A compound or its salt represented by the formula:



(I)

wherein each of R^1 and R^2 which may be the same or different is a hydrogen atom, a lower alkyl group, an aralkyl group, a lower alkoxycarbonyl group, an aryloxycarbonyl group, an aralkyloxycarbonyl group or a lower alkanoyl group which may be substituted by from one to three substituents selected from the group consisting of an amino group, a hydroxyl group, a carboxyl group, an aryloxy group, an aralkyloxycarbonylamino group, a lower alkoxycarbonylamino group and a



group (wherein each of X^1 and X^2 which may be the same or different is a hydrogen atom, a lower alkyl group, an aryl group or an aralkyl group, or X^1 and X^2 form together with the adjacent nitrogen atom a 5- or 6-membered heterocyclic group which may further contain a hetero atom selected from the group consisting of a nitrogen atom, an oxygen atom and a sulfur atom) and which may further contain a double bond in its carbon chain, each of R^3, R^4 and R^6 which may be the same or different is a hydrogen atom, a lower alkyl group, a cycloalkyl group, a cycloalkylalkyl group, an aryl group, an aralkyl group or a residue of an acidic, neutral or basic amino acid, R^5 is a hydrogen atom or a lower alkyl group, R^7 is a hydrogen atom, a lower alkyl, cycloalkyl, cycloalkylalkyl or aralkyl group which may be substituted by one or two hydroxyl groups or a residue of an acidic, neutral or basic amino acid, and R^8 is a hydroxymethyl group or a —CO—R^9 group (wherein R^9 is a hydroxyl group, a —OY group (wherein Y is a lower alkyl group, an aryl group, an aralkyl group, a lower alkoxyalkyl group, a lower alkanoyloxyalkyl group, a lower akloxycarbonyloxyalkyl group, or a 1-phthalidyl group) or a

group (wherein each of Y^1 and Y^2 which may be the same or different is a hydrogen atom, a lower alkyl group, an aryl group, an aralkyl group or a cycloalkyl group, or Y^1 and Y^2 form together with the adjacent nitrogen atom a 5- or 6-membered heterocyclic group which may further contain a hetero atom selected from the group consisting of a nitrogen atom, an oxygen atom and a sulfur atom)).

4,927,566
OIL AND FAT RELEASE METHOD
Rathindra N. Roychoudhury, Marysville, Ohio, assignor to Nestec S.A., Vevey, Switzerland
Filed Jan. 12, 1988, Ser. No. 143,351
Int. Cl.[5] C09F *5/00*; C11B *1/00*
U.S. Cl. 260—412 **10 Claims**

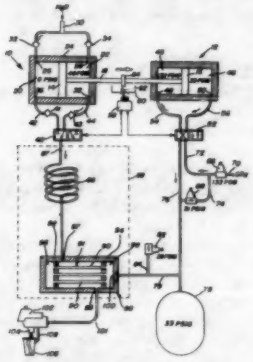
1. A process for obtaining glycerol fatty acid esters from glycerol fatty acid ester-containing materials comprising:
adding water to glycerol fatty acid ester-containing materials for dissociating and releasing glycerol fatty acid esters from the materials into water for forming a liquid comprising water and the glycerol fatty acid esters;
absorbing the liquid with an inert absorbing substance;
drying the inert absorbing substance containing the liquid for removing the water from the inert absorbing substance;
extracting the esters from the dried inert absorbing substance with a solvent for obtaining the esters in the solvent; and removing the solvent from the extracted esters.

4,927,567
MOTORLESS CONTINUOUS CARBONATOR
Arthur G. Rudick, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.
Filed Jun. 23, 1989, Ser. No. 370,886
Int. Cl.[5] B01F *3/04*
U.S. Cl. 261—35 **16 Claims**

1. A motorless carbonator for carbonated drink dispenser means, comprising:
a double acting water pump including a pair of pump chambers separated by a reciprocatory pumping member,
means for feeding still water alternately in and out of said pump chambers;
a double acting gas activated pump actuator including a pair of gas chambers separated by a reciprocatory actuator member powered by a differential gas pressure in said pair of gas chambers;
means for feeding carbonating gas alternately into said gas chambers at a relatively high pressure and out of said gas chambers at a relatively low pressure;
means for mechanically connecting said reciprocatory

pumping member of said pump to said reciprocatory actuator member of said pump actuator;

a carbonator assembly including a plurality of hollow semi-permeable membrane fibers coupled to said relatively low pressure carbonation gas out of said gas chambers and being located in a housing having a still water input port and a carbonated water output port, and wherein said



carbonating gas passes through said semi-permeable membrane fibers and dissolves into still water fed from said pump to said input port to form carbonated water which is fed to said output port; and

means connected to said output port of said carbonator assembly for feeding carbonated water to said drink dispensing means.

4,927,568

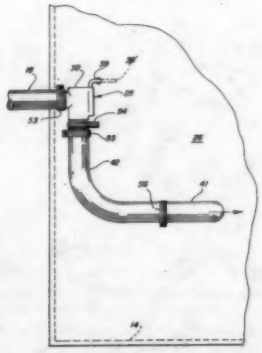
APPARATUS FOR AERATING WATER IN A CONTAINER

Daniel N. Campau, Grand Rapids, Mich., assignor to Flow-Rite Controls, Ltd., Grand Rapids, Mich.

Continuation-in-part of Ser. No. 196,025, May 19, 1988, Pat. No. 4,865,776. This application Aug. 31, 1989, Ser. No. 403,563

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—36.1 **4 Claims**



1. An apparatus for aerating water in a livewell mounted within a fishing boat, said apparatus comprising:

a livewell receptacle having sidewalls and a bottom for holding water, said receptacle including a drain port adjacent its bottom, an overflow port in one of said sidewalls, and an inlet;

conduit means and pump means in communication with an external water supply for providing water to said inlet;

an aerator apparatus mounted in said conduit means externally of said receptacle, said aerator apparatus including a main flow passageway in communication with an air intake conduit having a free end located internally of said receptacle and in communication with the ambient atmosphere at a level above said overflow port;

means within said aerator apparatus for aspirating air through said air intake conduit and into the water flowing through said main flow passageway;

an inlet conduit connected to said aerator apparatus for receiving said water and aspirated air, said inlet conduit being mounted externally of said receptacle; and

a tangential discharge tube connected to said inlet conduit, said tangential discharge tube mounted in one of the sidewalls of said receptacle and adapted to direct said water and aspirated air into said receptacle; said tangential discharge tube having a free end positioned below the level of the overflow port.

4,927,569

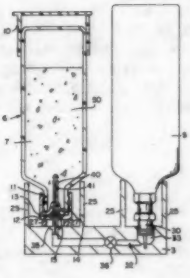
CARBONATION APPARATUS WITH CO_2 INJECTION INTO SERVING VESSEL

Bruce R. Robinson, 458 Batts Neck Rd., Stevensville, Md. 21401

Filed Mar. 1, 1989, Ser. No. 317,628

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—79.2 **8 Claims**



1. In a carbonation apparatus of the type comprising means for injecting CO_2 into liquid in an interior of an inverted serving vessel, said means including a nozzle for insertion into and through a self-sealing cap closing a lower end of said vessel, means mounting said nozzle in a vertical position in communication with a source of CO_2, said nozzle comprising a passage having a substantially vertically disposed axis and wherein the CO_2 flows through said passage in an axial direction in traveling from the source to the interior of the vessel and within the nozzle and entering the liquid substantially adjacent said cap, the improvement comprising means blocking vertical communication of said passage with the interior and wherein said nozzle further comprises at least first and second opposed CO_2 path means for communicating the passage to the interior of the vessel and each having an axis different from the axis of said passage, said path means being formed for imparting a force for directing injected CO_2 bubbles toward a helical path of travel.

4,927,570

METHOD FOR MANUFACTURING OPTICAL CABLES

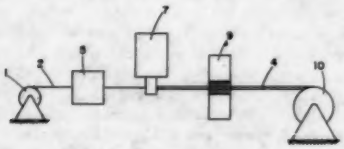
Otto Breitenbach, Nuremberg; Helmar Hetz, Sulzbach-Rosenber; Friedemann. Rous, and Josef Ottenreuther, both of Nuremberg, all of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany

Filed Oct. 20, 1988, Ser. No. 260,297

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3739879

Int. Cl.[5] G02B 6/22

U.S. Cl. 264—1.4 5 Claims



1. Method for manufacturing an optical cable comprising the steps of:

continuously drawing a cable core in a longitudinal direction through a sheathing station for forming a sheath about said cable core, said cable core including at least one optical fiber for the provision of a continuous light transmission path, said forming of said sheath comprising the successive steps of winding at least one layer of a metallic band in an overlapping manner about said cable core and then forming a wire mesh of metallic wires about said metallic band, said metallic band and said wire mesh in combination comprising said sheath of said cable core;

continuously drawing the sheathed cable core in a longitudinal direction through a jacketing station for forming an outer jacket of halogen free, cross-linkable plastic material about said sheath; and

continuously drawing the sheathed and jacketed cable core in a longitudinal direction through an energy radiation source having a radiation penetration selected so as to extend into the outer jacket but not beyond the thickness thereof, for causing a cross-linking of said plastic material of said outer jacket.

4,927,571

PREPARATION OF INJECTABLE DOXORUBICIN/LIPOSOME SUSPENSION

Anthony H. Huang, Sunnyvale, and Satya Krishnan, Mountain View, both of Calif., assignors to Liposome Technology, Inc., Menlo Park, Calif.

Filed May 18, 1987, Ser. No. 51,418

Int. Cl.[5] A61K 37/22, 45/05; B01J 13/02

U.S. Cl. 264—4.3 6 Claims

1. A method of preparing an injectable doxorubicin/-liposome suspension containing at least about 85% liposome-entrapped doxorubicin, comprising

reconstituting a dehydrated liposome composition characterized, in a pre-dehydration liposome dispersion, by:

a. liposome sizes predominantly in a selected size range between about 0.1 to 0.5 microns,

b. liposome-entrapped doxorubicin, in an amount which is at least about 90% of the total doxorubicin, and

c. between about 1% to 10% cryoprotectant, with an aqueous medium to a final liposome concentration of greater than about 100 mM lipid,

by said reconstituting, forming a liposome concentrate which shows substantially no increase in free doxorubicin when stored at 4° C for up to several months, and

diluting the reconstituted concentrate with an aqueous medium to a final liposome concentration suitable for intravenous injection.

4,927,572

METHOD OF MAKING A DECORATIVE PANEL WITH IMPROVED SURFACE CHARACTERISTICS

Johannes C. W. van der Hoeven, Horn, Netherlands, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 47,320, May 8, 1987, Pat. No. 4,801,495, which is a continuation of Ser. No. 734,148, May 15, 1985, abandoned. This application Sep. 14, 1988, Ser. No. 244,005

Claims priority, application Fed. Rep. of Germany, May 17, 1984, 3418282

Int. Cl.[5] B29C 43/20

U.S. Cl. 264—22 6 Claims

1. A method for producing a decorative panel, comprising the steps of:

providing an underlay;

applying to said underlay a decorative layer;

applying to said decorative layer a liquid coating consisting essentially of a radiation-polymerizable mixture;

applying radiation to form a radiation-polymerized layer on said decorative layer; and

thermopressing said underlay, said decorative layer and said radiation-polymerized layer together under conditions of elevated temperature and pressure such that a scratch resistance of at least about 1.5 Newtons, as measured by DIN 53 799, part 10, is imparted to said radiation-polymerized layer.

4,927,573

PROCESS FOR THE PRODUCTION OF BUILDING UNITS FROM AFTERHARDING MATERIALS

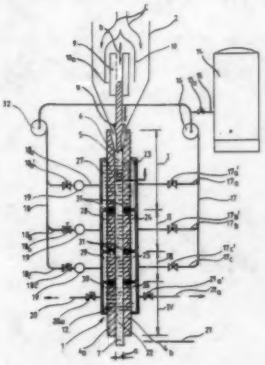
Tibor Alpár; János Györvári, and Ernö Schmidt, all of Szombathely, Hungary, assignors to Fakombinat, Szombathely, Hungary

Filed Sep. 14, 1989, Ser. No. 407,430

Claims priority, application Hungary, Mar. 5, 1987, 2004/87

Int. Cl.[5] B28B 3/20; B29C 47/00; C04B 40/00

U.S. Cl. 264—40.1 8 Claims



1. Process for the production of building units from an afterhardening mixture containing cement, additives and water as binding material, the process including the steps of admitting the afterhardening mixture into a die which has an inlet port for insertion of the afterhardening mixture and an outlet port for removal of the afterhardening mixture in compacted form, injecting CO_2 gas into the afterhardening mixture and bringing about a carbonation reaction with the afterhardening mixture, pressing the afterhardening mixture continuously in the die while injecting the CO_2 gas into the afterhardening mixture under pressure, controlling the injecting of the CO_2 gas so as to provide a greater amount of the gas flowing through the after-

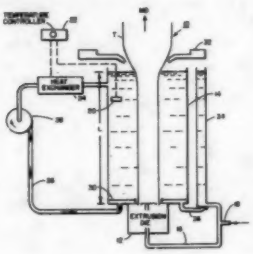
hardening mixture near the inlet port of the die as compared to the amount of the gas flowing through the afterhardening mixture near the outlet port, mechanically compacting the afterhardening mixture at the inlet port and faces of the die, and thereby forming a generally gastight seal between the afterhardening material and the die, controlling the injecting of the CO_2 gas into the die so that full completion or essentially full completion of the carbonation reaction occurs, and removing the afterhardening mixture in compacted form from the die and separating the afterhardening mixture in compacted form into the building units.

4,927,574

WATER BATH FILM COOLING APPARATUS AND METHOD

Fox J. Herrington, Holcomb, N.Y., assignor to Mobil Oil Corp., New York, N.Y.

Filed Dec. 21, 1988, Ser. No. 287,218
Int. Cl.[5] B29C *47/92*
U.S. Cl. 264—40.6 **15 Claims**



1. An apparatus for the production of a tubular thermoplastic film; comprising means for continuously extruding a seamless tube of molten film material in a generally upward direction; rapid quenching means for applying a liquid cooling medium to the external surface of said molten tubular film downstream of said extruding means; means for maintaining a pressure interiorly of said film tube during passage thereof through said liquid cooling medium; means for controlling the temperature of said liquid cooling medium; and means for maintaining a predetermined optimized pressure differential between the exterior of the film tube over the height of the liquid cooling medium and the interior of the film tube so as to thereby enhance the speed of cooling and increase the strength of the film material by minimizing the crystallinity thereof upon extrusion from said apparatus and passage through said quenching means.

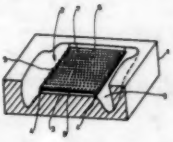
9. A method for the production of a tubular thermoplastic film; comprising continuously extruding a seamless tube of molten film material in a generally upwardly directed orientation;; applying a liquid cooling medium to the external surface of said molten tubular film downstream of said extruding means for rapidly quenching said molten material; maintaining a pressure interiorly of said film tube during passage thereof through said liquid cooling medium; controlling the temperature of said liquid cooling medium; and maintaining a predetermined optimized pressure differential between the exterior of the film tube over the height of the liquid cooling medium and the interior of the film tube so as to thereby enhance the speed of cooling and increase the strength of the film material by minimizing the crystallinity thereof subsequent to extrusion and during said rapid quenching.

4,927,575

PROCESS FOR PRODUCING FOAM CUSHIONS

Martin Brock, Cologne, and Pohlig Ralf, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 17, 1989, Ser. No. 339,452
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813587
Int. Cl.[5] B29C *67/22*
U.S. Cl. 264—46.4 **6 Claims**



1. In a process for producing a foam cushion having sections of different hardnesses using foam molding, comprising introducing a first reaction mixture into a mold cavity, introducing a second reaction mixture into the mold cavity, said second mixture already being in a creamed state, allowing the reaction mixtures to foam, and removing the resultant product from the mold cavity, the improvement wherein

(i) prior to the introduction of said first reaction mixture, a web with holes in it is clamped over a deepened section of the mold cavity to provide a space below said web and a remaining space above and to the sides of said web;

(ii) said first reaction mixture is fed onto said web, said first mixture being in a sufficiently liquid state such that it flows through said holes and into said space below said web; and

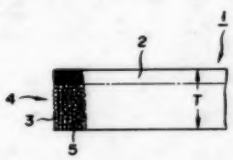
(iii) said second reaction mixture is fed into said space remaining above and to the sides of said web, said second mixture being sufficiently creamed up so that it does not flow through said holes in said second web.

4,927,576

METHOD FOR THE MANUFACTURE OF FLAT PERMEABLE MEMBRANE

Yukio Seita, Fuji, and Makoto Emi, Fujinomiya, both of Japan, assignors to Terumo Kabushiki Kaisha (Terumo Corporation), Tokyo, Japan

Division of Ser. No. 796,433, Nov. 8, 1985, Pat. No. 4,743,375. This application Jan. 21, 1988, Ser. No. 146,726
Claims priority, application Japan, Nov. 9, 1984, 59-236180; Aug. 29, 1985, 60-188480
Int. Cl.[5] B29C *67/20*
U.S. Cl. 264—49 **16 Claims**



1. A method for the manufacture of flat permeable membrane, comprising the steps of:

mixing a polyolefin, an organic filler uniformly dispersible in said polyolefin in the molten state thereof, and crystal seed forming agent for said polyolefin;

discharging the resultant mixture in the molten state thereof through a die;

bringing one surface of the discharged molten membrane into contact with a cooling roll thereby cooling and solidifying said membrane;

placing the cooled and solidified flat membrane into contact with an extractant capable of dissolving and extracting said organic filler and incapable of dissolving said polyolefin thereby extracting and removing said organic filler from said membrane; and

subjecting the cooled and solidified flat membrane in a fixed state in longitudinal and lateral directions to a heat treatment at a temperature 20° to 50° C. lower than the melting point of said polyolefin.

4,927,577

PROCESS FOR FIRING CERAMIC HONEYCOMB STRUCTURAL BODIES

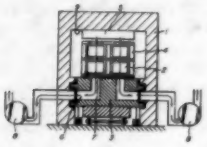
Masashi Ohtaka, Mie, and Kazuhiro Miyahara, Nagoya City, both of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Feb. 22, 1988, Ser. No. 158,670

Claims priority, application Japan, Feb. 27, 1987, 62-43178

Int. Cl.[5] C04B 35/64

U.S. Cl. 264—63 1 Claim



1. A process for firing ceramic honeycomb structural bodies containing a shaping aid and having a plurality of partition walls defining a plurality of through holes, comprising forcing passage of a firing atmosphere gas having a temperature equal to that of the firing atmosphere surrounding an exterior of the ceramic honeycomb structural bodies through the through holes of the ceramic honeycomb structural bodies at a speed of about 1.0–5 m/s, in order to heat said ceramic honeycomb structural bodies and thus uniformly burn and remove said shaping aid contained therein at inner and outer portions thereof.

4,927,578

METHOD FOR PRODUCING UNCROSSLINKED POLYACETYLENE FILM

Herbert Naarmann, Wattenheim, and Nicolas Theophilou, Philadelphia, both of Pa., assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 18, 1988, Ser. No. 195,663

Claims priority, application Fed. Rep. of Germany, May 21, 1987, 3717067

Int. Cl.[5] B29C 41/08; B05D 3/04

U.S. Cl. 264—81 30 Claims

6. A process for preparing a polyacetylene film, which comprises the steps of:

(a) preparing a catalyst solution containing an organic aluminum compound, a titanate and an inert solvent;

(b) applying the catalyst solution to a substrate;

(c) polymerizing acetylene over the catalyst solution and substrate at from −10° to 100° C. to form a polyacetylene film;

(d) treating the polyacetylene film with a reducing agent, wherein the reducing agent is inert to the organoaluminum compound and is added at from 0.01 to 10% by weight based on the amount of catalyst system components;

(e) stretching the polyacetylene film;

(f) washing the polyacetylene film after the polyacetylene film has been stretched;

(g) drying the polyacetylene film under an inert gas; and

(h) doping the polyacetylene film with electron donors or electron acceptors.

4,927,579

METHOD FOR MAKING FIBER-REINFORCED PLASTICS

Eugene R. Moore, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 8, 1988, Ser. No. 179,346

Int. Cl.[5] B29C 47/00

U.S. Cl. 264—101 16 Claims

1. A method for reducing fiber breakage in preparing fiber reinforced plastic extrudate comprising:

blending a low viscosity polymer solution having a total resin solids content in the range from 20 to 90 percent and a viscosity not greater than 50,000 centipoises and chopped fibers under low to moderate shear mixing conditions at a mixing speed in the range from 5 to 300 revolutions per minute and a temperature below the boiling point of the solvent of said polymer solution to form a dispersion of chopped fibers in said polymer solution, the dispersion having not more than 60 volume percent of reinforcing fiber;

blending said dispersion into a molten polymer to be reinforced; and

extruding the resultant blend while simultaneously removing the solvent therefrom to form a reinforced fiber plastic extrudate.

4,927,580

METHOD FOR MANUFACTURING ELECTRONIC DEVICE INCLUDING A VIBRATION GENERATING ELEMENT

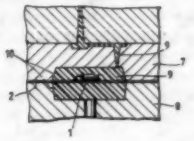
Kazuhiko Nasu; Kazuei Kenmochi; Tomohiko Niikawa, and Atsushi Matsui, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 14, 1988, Ser. No. 284,427

Claims priority, application Japan, Dec. 15, 1987, 62-316613

Int. Cl.[5] B29C 45/14

U.S. Cl. 264—102 9 Claims



1. A method for manufacturing an electronic device having therein a lead frame and a vibration-generating element integrally provided on said lead frame, comprising the steps of;

(a) inserting said lead frame and said element into a metallic mold assembly comprising an upper mold portion and a lower mold portion, said upper and lower mold portions respectively having recess portions so as to form a cavity when said upper and lower mold portions are assembled with each other;

(b) injecting into said cavity a first sealing material having a shrinkage property and a low adhesion property so that said element is covered by the injected first sealing material, the shrinkage property and low adhesion property of said first material causing formation of a space on said element in response to solidification so as to prevent the vibration of said element from being impeded;

(c) after the solidification of the injected first sealing material, removing said lead frame and said sealing-material-covered element from said mold assembly immersing it in a second sealing material at a vacuum state so that said second sealing material is impregnated between said first sealing material portion and said lead frame to seal the space therebetween; and

(d) after release from the immersion state, curing said second sealing material impregnated therebetween.

4,927,581

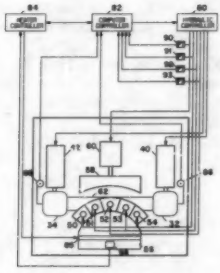
METHOD FOR SHAPING FIBER REINFORCED RESIN MATRIX MATERIALS

Steven J. Medwin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 259,837, Oct. 19, 1988, abandoned. This application May 4, 1989, Ser. No. 347,054

Int. Cl.[5] **B29C** *55/00*

U.S. Cl. 264—108 **11 Claims**



1. A method of shaping a composite structure of a resin matrix reinforced with fibers into a predefined path, said composite structure having a longitudinal axis, said method comprising:

(a) defining said path as a plurality of adjoining component lengths;

(b) stretching said structure from each of its ends by applying a force to each end along its longitudinal axis away from said ends to shape the structure into at least one formed component length defined by said path;

(c) heating said structure intermediate its ends while stretching the structure according to step (b);

(d) holding said one formed component length of the structure in place while stretching said structure as in step (b) to shape the structure into formed component lengths adjoining said one formed length; repeating step (d) to complete the formation of said structure into a predefined path; and

(e) cooling the structure.

4,927,582

METHOD AND APPARATUS FOR CREATING A GRADUATED DISTRIBUTION OF GRANULE MATERIALS IN A FIBER MAT

Robert E. Bryson, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 899,179, Aug. 22, 1986, abandoned. This application Mar. 17, 1988, Ser. No. 170,587

Int. Cl.[5] **D04H** *1/04;* **F15D** *1/02;* **B65G** *53/52*

U.S. Cl. 264—113 **25 Claims**

1. An apparatus for forming an absorbent body, comprising:

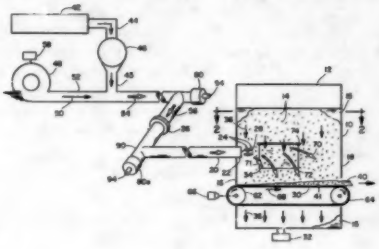
a. a forming chamber;

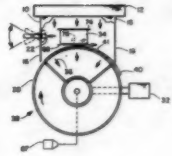
b. fiber delivering means for providing a flow of fibrous material within said forming chamber;

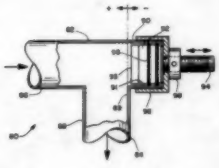
c. a forming layer, which is located in said forming chamber and is movable therein, for receiving a deposit of said fibrous material thereon to form said absorbent body;

d. conduit means for supplying a flow of dispersed bodies of high-absorbency material, which enters said forming chamber and intermixes with said flow of fibrous material therein; and

e. regulating means for controlling a velocity of said flow of high-absorbency material into said flow of fibrous material to provide high-absorbency material having various shorter, longer and intermediate trajectories, wherein said various trajectories deposit the high-absorbency material at different locations in said forming chamber to thereby selectively distribute said high-absorbency material







through a thickness dimension of said absorbent body to produce a concentration gradient of high-absorbency material along said thickness dimension.

19. A conduit section for changing a flow direction of a gas particle dispersion, comprising:

a. a first, substantially linear conduit section;

b. a second, substantially linear conduit section which intersects in fluid communication with said first conduit section to form a T-bend enters said conduit section, an exit arm from which said dispersion departs from said intersection with a changed flow direction, and a blinded arm; and

c. adjustment means for selectively controlling an effective conduit length of said blinded arm, said adjustment means located in said blinded on and constructed to position a

face surface of said adjustment means at a location which can be recessed into and protruded from said blinded arm by a selected distance to thereby provide a substantially uniform distribution of particles in said dispersion departing from said exit arm.

4,927,583

PROCESS FOR THE MANUFACTURE OF POLYAMIDE COMPOSITE MATERIAL REINFORCED WITH LONG FIBERS

Michel Lottiau, Bernay; Michel Gleinet, Serquigny; Gilles Cognet, and Alain Cassier, both of Bernay, all of France, assignors to Atochem, France

Filed Sep. 9, 1987, Ser. No. 95,047
Claims priority, application France, Sep. 17, 1986, 86 12997
Int. Cl.[5] B32B 31/16, 31/26
U.S. Cl. 264—136 9 Claims

1. A process for the manufacture of a polyamide composite material reinforced with long fibers, the improvement comprising impregnating the fibers with a polyamide oligomer or prepolymer, heat-treating the impregnated fiber to polymerize said oligomer or prepolymer, and then shaping the impregnated fiber by pultrusion.

4,927,584

METHOD OF CUSTOM MANUFACTURING SHOES AT A SPECIFIED HEEL HEIGHT

Donald R. Pfrimmer, 1550 Old Hickory Blvd., Brentwood, Tenn. 37027

Filed Jul. 22, 1986, Ser. No. 888,479
Int. Cl.[5] B29C 45/16
U.S. Cl. 264—154 6 Claims

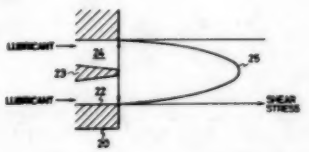
1. A method of custom manufacturing shoes at a specified heel height with a predetermined sole thickness, comprising:
forming a negative impression mold of a foot for which a shoe is to be made with the foot oriented at the specified heel height;
filling the negative impression mold with a settable material adapted to set into a hard mass to form a positive impression mold of the foot;
removing the positive impression mold from the negative impression mold after the positive impression mold hardens;
dividing the positive impression mold into an upper and lower part;
providing a sole impression box having a bottom, sides, an open top, and a removable cover for being placed on the open top, said cover having an underside;
providing a sole impression form having an upper surface shaped to correspond to the lower surface of a sole of a shoe with the specified heel height;
placing the sole impression form in the box on the bottom thereof so that the upper surface of the form faces the open top of the box;
atttaching the lower part of the positive impression mold to the underside of the cover of the sole impression box so that when the cover of the box is placed on the open top of the box, the lower surface of the lower part of the positive impression mold is separated from the upper surface of the sole impression form by a space such that the distance of separation between the positive impression mold and the sole impression form is approximately equal to the desired sole thickness;
placing the cover on the open top of the box;
introducing a settable material adapted to harden to form a suitable sole into the space through an opening in the box;
permitting air displaced when the settable material is introduced into the space to escape through a second opening in the box so that the settable material substantially fills the space between the positive impression mold and the sole impression form;
permitting the settable material that was introduced between the positive impression mold and the sole impression form to harden to form a sole;
separating the sole from the positive impression mold and the sole impression form;
attaching upper materials to the sole; and
attaching a heel of the specified heel height to the sole.

4,927,585

PROCESS FOR PRODUCING HIGHLY ORIENTED RESIN-MADE REINFORCING MEMBER

Fumio Suzuki; Nobuhiro Akasaka, and Makoto Honjo, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Division of Ser. No. 826,698, Feb. 6, 1986, Pat. No. 4,721,637.
This application Sep. 28, 1987, Ser. No. 101,696
Claims priority, application Japan, Feb. 6, 1985, 60-15781; Feb. 6, 1985, 60-15782
Int. Cl.[5] B29C 47/02, 47/94
U.S. Cl. 264—171 6 Claims



1. A process for producing a reinforcing member in a form a of a solid wire or rod that contains a highly oriented resin as principal component and in which a degree of orientation decreases from center to periphery of said solid wire or rod, said process using a die having a molding port comprising at least one concentric molten resin extruding nozzle having a side wall with an inner and outer surface and a projecting rod member disposed along a central axis of said nozzle, and said process comprising extruding a molten highly oriented resin through said nozzle as a lubricant is applied to the inner surface of the side wall of said nozzle opposite to the projecting rod member such that shear stress applied to the resin is continuously increased from periphery to center.

4,927,586

PROCESS FOR PREPARING POLYVINYL ALCOHOL YARN

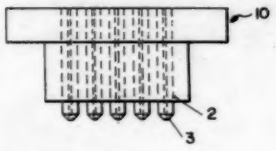
Jan Smook, Dieren; Gerardus J. H. Vos, Westervoort; Johannes A. Julju, Velp, and Theodorus J. Van Hees, Dieren, all of Netherlands, assignors to AKZO N.V., Arnhem, Netherlands

Filed Aug. 31, 1988, Ser. No. 238,602
Claims priority, application Netherlands, Aug. 31, 1987, 8702038; Fed. Rep. of Germany, Aug. 5, 1988, 3826621
Int. Cl.[5] D01F 6/14
U.S. Cl. 264—185 14 Claims

1. A process for preparing a yarn having a tenacity of at least 90 cN/tex, comprising:
extruding a solution of a polyvinyl alcohol which has a viscosity average molecular weight $\overline{M}_v$ in the range of 10^5 to 4×10^5 in an organic solvent from a spinneret having

capillaries into a coagulation bath through an air gap or inert gas gap; and

drawing the extruded polyvinyl alcohol solution;



wherein a length of the capillaries of the spinneret in the direction of flow is at least 5 times a diameter of said capillaries, and a concentration of the polyvinyl solution is at least $30-(\overline{M}_v/20{,}000)$ in percent by weight of the polyvinyl alcohol solution.

4,927,587

METHOD FOR MANUFACTURING EXTRUSION MOLDED SILICONE INSULATING ARTICLES

Masaharu Takahashi, and Takeo Yoshida, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1989, Ser. No. 316,959

Claims priority, application Japan, Feb. 29, 1988, 63-46049

Int. Cl.[5] B29C *47/00, 47/06;* **B32B** *1/08;* **C08K** *3/38*

U.S. Cl. 264—211 **6 Claims**

1. A method for manufacturing an extrusion molded silicone insulating article having improved electrical insulation, comprising the steps of:

extrusion molding a silicone rubber composition comprising

(A) 100 parts by weight of an organopolysiloxane having an average unit formula:

$$R_aSiO_{(4-a)/2} \quad (I)$$

wherein R is at least one radical selected from the group consisting of unsubstituted monovalent hydrocarbon radicals and substituted monovalent radicals each having 1 to 10 carbon atoms, and a is a number having a value of from 1.95 to 2.05,

(B) 5 to 500 parts by weight of a finely divided silica filler having a specific surface area of from 1 to 500 m^2/g,

(C) 2 to 20 parts by weight of powder boron nitride having a mean particle size of from 0.4 μm to 10 μm, and

(D) 0.01 to 5 parts by weight of a curing catalyst, and

curing the molded composition.

4,927,588

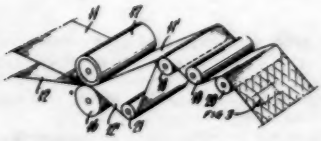
METHOD MULTI-PLY EMBOSSED FIBROUS SHEET

Galyn A. Schulz, Appleton, Wis., assignor to James River Corporation of Virginia, Norwalk, Conn.

Filed May 24, 1988, Ser. No. 198,146

Int. Cl.[5] B29C *59/04;* **B32B** *31/20*

U.S. Cl. 264—258 **4 Claims**



1. A process for the production of a soft, absorbent multi-ply embossed towel or fibrous tissue product which comprises forming a multi-ply sheet of unembossed fibrous webs, simultaneously embossing said fibrous webs by passing said multi-ply sheet through the nip of an embossing roll and a back-up roll, separating the embossed multi-ply sheet into separate embossed webs, longitudinally displacing one of said webs of said sheet from another, and recombining said webs into a single multi-ply sheet with the embossments of one web out of register with the embossments of the other by an amount sufficient to prevent nesting of the embossments.

4,927,589

METHOD FOR MANUFACTURING ORGANIC THIN FILM

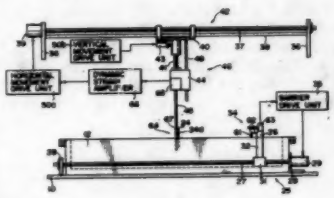
Syun Egusa, Yokohama; Akira Miura, Toride, and Nobuhiro Genma, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 21, 1988, Ser. No. 287,281

Claims priority, application Japan, Mar. 16, 1988, 63-62263; Sep. 20, 1988, 63-235301

Int. Cl.[5] B29C *39/04, 39/12;* **B05D** *1/20*

U.S. Cl. 264—259 **9 Claims**



1. A method of manufacturing a multi-layered organic thin film comprising the steps of:

preparing a liquid surface for forming a developing region in which a monomolecular film of organic molecules can be developed;

developing a monomolecular film of organic molecules in the developing region;

compressing the developed monomolecular film to a predetermined surface pressure;

supporting a workpiece so that a build-up surface of the workpiece is located perpendicular to the developed monomolecular film; and

moving the workpiece through the developed monomolecular film in a direction inclined to the developed monomolecular film that includes a directional component which is perpendicular to the build-up surface and directed ahead thereof, to thereby build up the monomolecular film on the build-up surface.

4,927,590

METHOD FOR ENCAPSULATING INTEGRATED CIRCUITS

Gerhard W. Poelzing, New Providence, N.J., assignor to At&T Bell Laboratories, Murray Hill, N.J.

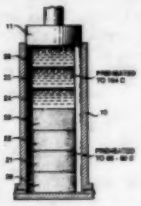
Filed May 26, 1989, Ser. No. 358,313

Int. Cl.[5] B29C *45/02, 45/14*

U.S. Cl. 264—272.17 **8 Claims**

2. A process for molding a plastic package around an integrated circuit device by placing the device in a mold cavity and injecting uncured molding material into the cavity under pressure the steps of: preheating a plurality of resin preforms, said preforms having a tablet shape, stacking the plurality of preheated preforms into a cylindrical stack, placing the stacked preheated preforms into a cylindrical pressure chamber, said chamber having a diameter larger than the diameter of the stack, and having at least one passageway extending from the chamber to the mold cavity, and applying pressure to the stack

of preforms to force the molding material through the passageway to the mold cavity the process characterized in that at



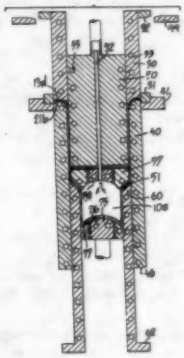
least one preform is preheated to a temperature more than 10 degrees C. higher than the temperature of another.

4,927,591

CONTAINER, METHOD AND APPARATUS FOR MANUFACTURING THE SAME

Torsten Nilsson, Löddeköpinge, Sweden, assignor to Petainer S.A., Neuchatel, Switzerland

Filed Aug. 14, 1986, Ser. No. 902,456
Claims priority, application Sweden, Dec. 14, 1984, 8406373
Int. Cl.[5] B29C *17/03, 17/07*
U.S. Cl. 264—532 **26 Claims**



1. A method of shaping a substantially tubular preform of deformable plastic material into a hollow body, said method comprising:

providing a tubular preform of deformable plastic material having a closed bottom, an open mouth and a tubular wall between the bottom and the mouth,

positioning a mandrel at the open mouth of the tubular preform in spaced relation from the closed bottom of the preform so that the interior of the preform is hollow and unoccupied, the mandrel having an outer diameter which is greater than the inner diameter of the tubular preform,

forming an outwardly flared edge portion on said preform at said open mouth,

clamping said flared edge portion of the preform between mechanical clamping devices around and outside said mandrel, and

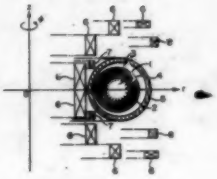
relatively displacing said mandrel and said mechanical clamping devices to cause said mandrel to move into the hollow interior of said tubular preform causing the wall of the preform to progressively expand circumferentially while said open mouth remains clamped by said mechanical clamping devices.

4,927,592

REVERSED FIELD PINCH APPARATUS

Sataro Yamaguchi, Tokyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jul. 13, 1988, Ser. No. 218,162
Claims priority, application Japan, Jul. 16, 1987, 62-175814
Int. Cl.[5] G21B *1/00*
U.S. Cl. 376—123 **10 Claims**



1. In a reversed field pinch apparatus including a toroidal vacuum vessel in which a plasma is confined, a coil arrangement comprising:

a first ohmic heating coil means supplying an alternating current for F-Θ pumping, said first coil means including a first coil which is coaxial with respect to said vacuum vessel and is inductively coupled with said plasma and

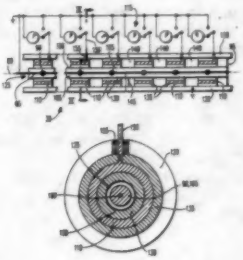
a second ohmic heating coil means supplying a direct current which is greater than the alternating current for generating a plasma current in said plasma, said second coil means including a second coil which is inductively coupled with said plasma.

4,927,593

BETA RAY FLUX MEASURING DEVICE

Albert J. Impink, Jr., and Norman P. Goldstein, both of Murrysville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 25, 1988, Ser. No. 275,983
Int. Cl.[5] G21C *17/00*
U.S. Cl. 376—254 **15 Claims**



8. A beta ray flux measuring device connectable to a reactor vessel containing a reactor coolant at a pressure, for detecting a beta ray flux emitted from respective portions of an activated member irradiated at corresponding sensing positions within the vessel, said detector comprising:

a pressure boundary defining an inner space with a central axis and being connectable to the reactor vessel so that the inner space contains some of the reactor coolant at substantially the pressure;

an outer insulator positioned around the central axis within the inner space;

a collector ring having a response characteristic and being positioned within the inner space and around the central axis; and

an inner conductor positioned around the central axis and within said collector ring so as to be electrically isolated from said collector ring.

4,927,594

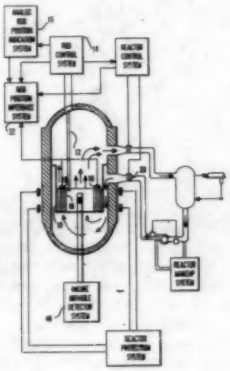
THERMOCOUPLE BASED CONTROL ROD POSITION INDICATION SYSTEM

Michael D. Heibel, Plum Borough; Albert J. Impink, Jr., Murrysville Borough, and Louis R. Grobmyer, North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 10, 1988, Ser. No. 230,393

Int. Cl.[5] G21C *17/00*

U.S. Cl. 376—258 **7 Claims**



7. A rod position determination method comprising the steps of:

(a) measuring core coolant inlet temperature;

(b) measuring core coolant assembly exit temperature associated with a control rod;

(c) determining enthalpy rise from the inlet and exit temperature and a reference for an assembly containing the rod;

(d) determining rod position change ΔRj from

$$Bi = \Delta h / \Delta hR$$

$$\Delta Rj = Ki\ (\Delta hmi - Bi \cdot \Delta hmiR)$$

$$Ki = \partial R / \partial \Delta hmi = (mi / \Delta h100) \cdot \partial R / \partial fi$$

where Δh is a resistance temperature detector measured enthalpy rise, ΔhR is a reference resistance temperature detector measured enthalpy, FΔhmi is measured enthalpy rise, Δh100 is one hundred percent of full reactor power core enthalpy rise, ∂R/∂fi is the slope of the relation between the change in rod control cluster assembly j position and the change in the nuclear design prediction of the relative assembly power in the core location of thermocouple i, ΔhmiR is an incore measured reference enthalpy rise, mi is the thermocouple flow mixing factor, j is the rod control cluster identifier and i is the thermocouple identifier; and

(e) determining rod position from the rod position change and a reference rod position.

4,927,595

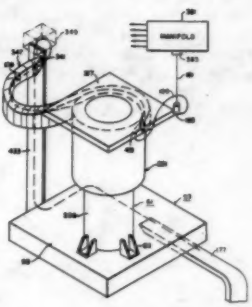
REFUELING OF NUCLEAR REACTOR

John W. Kaufmann, Murrysville; Kenneth J. Swidwa, Harmar Township, Allegheny County, and Leonard P. Hornak, North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 382,269, May 26, 1982, Pat. No. 4,832,902. This application Aug. 19, 1988, Ser. No. 234,112

Int. Cl.[5] G21C *19/00*

U.S. Cl. 376—268 **16 Claims**



14. Apparatus for refueling a nuclear reactor, said reactor being disposed in a pit in a containment under water and having component assemblies, of at least one type, a trolley, said trolley having facilities for controlling said apparatus, a supporting mast, means for engaging and raising and lowering said component assemblies of at least one type suspended in said pit from said supporting mast, hoist means supported on said supporting mast, said hoist means having cables connected to said engaging-raising-and-lowering means for raising or lowering said engaging-raising-and-lowering means on operation of said hoist means, electric and fluid-pressure operable means connected to said engaging-raising-and-lowering means for operating said engaging-raising-and-lowering means, electric-and-fluid-conductor handling facilities supported on said supporting mast, electrical conductors connecting said controlling facilities on said trolley and said electrical-conductor-handling facilities on said supporting mast, electrical and fluid conductors extending from said handling facilities and connected to said electric-and-fluid-pressure operable means for supplying electricity and fluid-pressure to operate said operable means, and bearing means on said trolley supporting said supporting mast rotatably, said engaging-raising-and-lowering means, said electric and fluid conductors and said hoist means and its cables and said facilities rotating together and with said supporting mast on rotation of said supporting mast, whereby the restriction of the rotation of said supporting mast and the twisting of the electric and fluid conductors and the fouling of the hoist cables by the electric and fluid conductors which would result from rotation of said supporting mast and the engaging-raising-and-lowering means suspended from said supporting mast relative to said hoist means and said electric-and-fluid-conductor handling facilities are precluded, a flexible cable tray connected to said supporting mast at one end, extending from said one end peripherally at least partly around said mast and thence departing from said mast and terminating at the opposite end a predetermined distance from said mast so that when said mast is rotated in one direction said tray is wound peripherally on said mast and when said mast is rotated in the opposite direction said tray is unwound peripherally from said mast, said electrical conductors, passing between said controlling facilities on said trolley and said electrical-conductor-handling facilities on said supporting mast, through said cable tray, entering said cable tray near said one end and leaving said cable tray near said opposite end, the said electrical conductors following the winding and unwinding of said tray,

said tray remaining fixed at said opposite end as said tray is wound on said mast or unwound from said mast, whereby said electrical conductors remain fixed at said opposite end as said mast is rotated, whereby the portion of said electrical conductors between said opposite end and said controlling facilities on said trolley remain fixed.

4,927,596

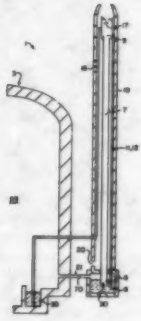
SELF-ACTUATING PRESSURE RELIEF DEVICE AND METHOD FOR NUCLEAR CONTAINMENT

Lawrence E. Minnick, Los Altos, Calif., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Continuation of Ser. No. 231,847, Aug. 12, 1988, abandoned. This application Aug. 4, 1989, Ser. No. 390,456

Int. Cl.[5] G21C 9/00

U.S. Cl. 376—283 21 Claims



19. A passive self-actuating pressure relief device for nuclear reactor containments having a sealing water chamber for holding water for cooling the reactor core in the event of an accident, the pressure relief device comprising:

a sealed chamber for holding a liquid material, the liquid within the sealed chamber having a normal operating liquid level;

piping means for coupling said sealed chamber to the reactor containment;

an extended standpipe in fluid communication with the interior of said sealed chamber, the standpipe having a first opening within the sealed chamber at a position below the normal operating liquid level and a second opening outside of and substantially above the sealed chamber;

a mixing chamber in fluid communication with the second standpipe opening and carried by the standpipe substantially above the sealed chamber;

a multiplicity of recirculating drain pipes for transporting liquid between said mixing chamber and said sealed chamber and cooling the transported liquid;

a moisture separator in communication with the mixing chamber for trapping water droplets that escape from the mixing chamber; and

an overflow drain in fluid communication between said mixing chamber and the reactor containment sealing water chamber;

whereby the normal operating liquid level within the sealed chamber is chosen to insure that when the pressure within the reactor containment surpasses a designated threshold pressure, sufficient liquid will be forced from the sealed chamber into the standpipe to cause the liquid level within the sealed chamber to fall below the first standpipe opening thereby allowing containment gases to escape from the sealed chamber into the standpipe.

4,927,597

DEVICE FOR COOLING THE MAIN VESSEL OF A FAST NEUTRON NUCLEAR REACTOR COOLED BY A LIQUID METAL

Alain Cros, Lyons, France, assignor to NOVATOME, Courbevoie, France

Continuation of Ser. No. 106,294, Oct. 9, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 313,341

Claims priority, application France, Oct. 9, 1986, 86 14052

Int. Cl.[5] G21C 11/00, 15/00

U.S. Cl. 376—290 5 Claims

1. In a fast neutron nuclear reactor having a main vessel (3) containing liquid metal coolant therein, said main vessel having a substantially cylindrical wall in its upper part and a dished bottom in its lower part and being arranged with its axis vertical and an inner vessel located inside the main vessel, having a diameter less than that of the main vessel and containing hot liquid metal coolant, a reactor core positioned in said inner vessel, said rector core being supported by a means including a flooring, said flooring being supported by said dished bottom of said main vessel, the improvement consisting of a cooling device (14) for cooling the main vessel, said cooling device consisting of

(a) a first annular collector between the upper part of the wall of the main vessel (3) and an overflow sleeve (18) coaxial with the main vessel (3) and of a diameter less than that of the main vessel but greater than that of the inner vessel;

(b) a second annular collector (16) between the overflow sleeve (18) and an inner sleeve (21) coaxial with the main vessel (3) and with the overflow sleeve (18) and of a diameter less than that of the overflow sleeve (18) but greater than that of the inner vessel; and

(c) a conduit means (17) connected to a lower end of the first collector and to a lower part of the flooring for conveying cooled liquid metal into said first collector (15), and contacting and cooling an inner wall of said main vessel (3), up to an upper part of the overflow sleeve, said overflow sleeve having a top at its upper part for conveying said cooled liquid metal into said second collector, said second collector having a bottom pierced by orifices debouching into an annular space between the inner vessel and the overflow sleeve, said annular space being in communication at its lower end with a part inside the main vessel containing cooled liquid metal, said annular space containing cooled liquid metal up to a level above the bottom of said second collector and less than the level of hot liquid metal in the inner vessel, the orifices in said bottom of said second collector being such that the level of cooled liquid metal in said second collector is controlled and maintained

above the level of cooled liquid metal in the annular space, said overflow sleeve and said inner sleeve each being a right circular cylinder having a substantially constant diameter throughout its length;

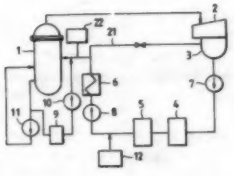
(d) wherein the inner sleeve (21) of said second collector (16) has a length substantially less than the length of the overflow sleeve (18), the upper ends of these sleeves (18, 21) being substantially at the same level, and the lower part of the inner sleeve (21) of said second collector (16) being connected to the overflow sleeve 18 in a region substantially equidistant from each end of said overflow sleeve (18) by said bottom of said second collector.

4,927,598

RADIOACTIVITY REDUCTION METHOD OF A NUCLEAR POWER PLANT AND A NUCLEAR POWER PLANT REDUCED IN RADIOACTIVITY

Yoshitaka Nishino; Toshio Sawa; Katsumi Ohsumi, and Hisao Itow, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 6, 1988, Ser. No. 240,601
Claims priority, application Japan, Sep. 9, 1987, 62-223949
Int. Cl.[5] G21D *3/08*
U.S. Cl. 376—306 **7 Claims**



6. A method of reducing radioactivity in a nuclear power plant, comprising the steps of injecting iron ion and one of beryllium and beryllium ion into a primary cooling water in a primary cooling water recirculation line of the power plant, heating and recirculating the primary cooling water, and forming a film including 95% or more of nickel ferrite and/or cobalt ferrite on each surface of piping of the primary cooling water recirculation line and structural members disposed in said primary cooling water recirculation line in contact with the primary cooling water.

4,927,599

THERMIONIC CONVERTER EMITTER SUPPORT ARRANGEMENT

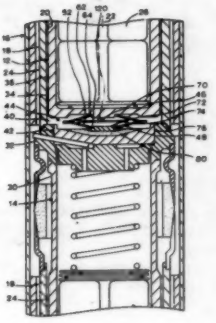
Daniel T. Allen, La Jolla, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 6, 1989, Ser. No. 376,071
Int. Cl.[5] G21C *7/00*
U.S. Cl. 376—321 **3 Claims**

1. In a thermionic fuel element which includes a housing with a hollow collector having an axis, an emitter lying primarily within and coaxial with the collector and wherein the emitter has a front end supported on the housing and a rear free end spaced from the housing and the collector thereof, a quantity of nuclear reactor fuel within the emitter, a spring structure having front and rear ends with the front end engaging the emitter free end to keep it coaxial with the collector while allowing the emitter free end to axially expand and contract as it is heated and cooled, the improvement of a support structure for supporting the rear end of the spring structure, comprising:

a metal spring-engaging element having a portion which engages the rear end of the spring structure, and having a rear surface;

a metal main support having a forward surface facing said spring-engaging element and a periphery attached to said housing;



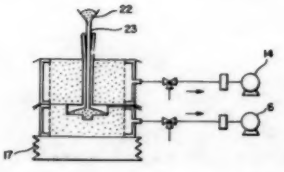
a ceramic layer lying between said main support and said spring-engaging element, said ceramic layer being hot-press bonded to said rear surface of said spring-engaging element and to said front surface of said main support.

4,927,600

METHOD FOR MOLDING OF POWDERS

Tsuneo Miyashita, Yokohama; Hiroaki Nishio, Yokohama; Kazuya Yabuta, Chiba, and Yoshio Takagi, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 866,359, May 23, 1986, abandoned.
This application Oct. 8, 1987, Ser. No. 105,985
Claims priority, application Japan, May 28, 1985, 60-113301
Int. Cl.[4] B22F *1/00*
U.S. Cl. 419—49 **4 Claims**



1. A method of molding powders of metals or ceramics comprising the steps of:

forming a cavity within an air-permeable mold carrier of a powdered filler material, a wall of said cavity being coated with a water-soluble film, and maintaining the shape of said powdered filler material by use of a vacuum;

introducing into said cavity of said mold carrier a pouch-like member of thin-walled rubber-like resilient material, said pouch-like member carrying moisture on the outer surface thereof;

dissolving said water-soluble film by contacting said water-soluble film with said pouch-like member, during the use of said vacuum in such a degree that said pouch-like member is inflated and tightly contacted to said wall of said cavity in said mold carrier, thereby forming a mold;

charging starting powders into said mold;

discharging air from the inside of the mold to a desired degree of vacuum through an opening of said pouch-like member;

sealing said evacuated mold while the pouch-like member is within the cavity of said mold carrier;

re-establishing an atmospheric pressure to said powdered

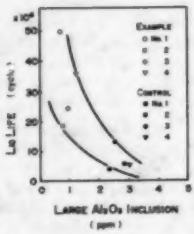
filler material thereby disintegrating the air-permeable mold carrier so as to remove a preformed molding in a form contained in said sealed pouch-like member; and pressing the preformed molding while the molding is sealed within the pouch-like member by a cold or hot isostatic press to densify the same.

4,927,601

HEAT RESISTING BEARING STEEL

Tomohito Iikubo, Nagoya, and Yutaka Kurebayashi, Tokai, both of Japan, assignors to Daido Tokushuko Kabushiki Kaisha, Nagoya, Japan

Filed Sep. 6, 1988, Ser. No. 240,658
Int. Cl.[5] C22C *38/22, 38/24*
U.S. Cl. 420—111 2 Claims



1. A heat resisting bearing steel consisting essentially of 0.6–0.9 % C, up to 0.5 % Si, up to 0.5% Mn, 3.0–5.5 % Cr, 3.0 to 5.0% Mo and 0.5–1.5% V, and the balance being Fe and inevitable impurities; and the content of large Al_2O_3 inclusions having a length of 10 microns or larger being restricted to 1.5 ppm or less.

4,927,602

HEAT AND CORROSION RESISTANT ALLOYS

John H. Culling, St. Louis, Mo., assignor to Carondelet Foundry Company, St. Louis, Mo.

Filed Sep. 27, 1989, Ser. No. 413,288
Int. Cl.[5] C22C *30/02*
U.S. Cl. 420—586 7 Claims

1. An air meltable, weldable alloy having good hot gas corrosion resistance above about 1800° F. and exceptional hot strength above about 1600° F. and which can be cast or forged in air, consisting essentially of:

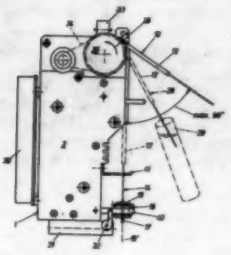
Nickel	35–46% by weight
Chromium	25–29%
Cobalt	10–13%
Tungsten	5.5–8%
Columbium	0.2–1.5%
Zirconium	0.2–1.5%
Titanium	0.05–0.5%
Carbon	0.3–0.9%
Manganese	up to 1.5%
Silicon	up to 2%
Nitrogen	up to 0.3%
Iron	essentially the balance

4,927,603

FEEDING DEVICE FOR INTRODUCING LIQUID OR GASEOUS SAMPLES

Fritz Fischer; Erich Kleinhappl, and Hermann Marsoner, all of Graz, Austria, assignors to AVL AG, Switzerland

Filed Jun. 29, 1988, Ser. No. 213,155
Claims priority, application Austria, Jul. 2, 1987, 1672/87
Int. Cl.[5] G01N *35/00*
U.S. Cl. 422—67 7 Claims



1. A feeding device for introducing liquid or gaseous samples into an analysis path of an analyzing apparatus which comprises

a link chain mounted on a guide pulley,

a stepping motor for driving said link chain,

a control means for controlling the operation of said stepping motor,

a feeder element comprising a needle holder and a hollow needle, said feeder element being connected to said link chain by chain pins, said control means controlling the operation of said stepping motor and thus the movement of said link chain such that, starting from an initiel position where said needle holder is remote from said guide pulley and said hollow needle is located in a feed opening of an element wherein it can be contacted with calibrating or cleansing media, movement of said link chain in a first direction will cause said needle holder to move along an axis defined by the feed opening and, as said needle holder moves around said guide pulley, to tilt said hollow needle relative to said axis into a first sample intake position.

4,927,604

MULTIWELL FILTER PLATE VACUUM MANIFOLD ASSEMBLY

Gregory Mathus, Concord, and George Lyman, Cape Porpoise, both of Mass., assignors to Costar Corporation, Cambridge, Mass.

Filed Dec. 5, 1988, Ser. No. 280,170
Int. Cl.[5] G01N *1/14*
U.S. Cl. 422—101 23 Claims

1. A filtration system for handling 96 well filter plates or filter strips wherein the plates or strips have an array of wells each including a generally cylindrical side wall closed at the bottom by a filter membrane and open at the top comprising

a manifold having continuous side and end walls and a bottom wall connected to the side and end walls upwardly of the bottom edges thereof so as to be disposed above a supporting surface when the manifold is placed with lower edges of the side and end walls on the surface,

a shoulder in the side and end walls for supporting a plate or strip placed in the manifold,

a plurality of supports extending upwardly from the bottom wall for engaging the filter membranes disposed at the bottom of the cylindrical wall of each well when the plate or strip is supported on the shoulder,

a first sealing surface in the side and end walls coplanar with the open tops of the cylindrical walls of the wells when the plate or strip is disposed in the manifold and the bottoms of the cylindrical walls are engaged by the supports,

a sheet of sealing material disposed on the first sealing surface and engaging the tops of the wells and having means defining openings therein registering with the open tops of the cylindrical walls, said sheet preventing entry of material between said wells,

a vacuum hose fitting in one of the side or end walls for connecting a low pressure source to the manifold above the bottom wall, the low pressure source causing the sheet of sealing material to seal about the tops of the cylindrical walls and draw filtrate material in the wells through the filter membrane,

an imperforate removable film disposed over the top of the manifold for maintaining a sterile atmosphere in the manifold prior to use,

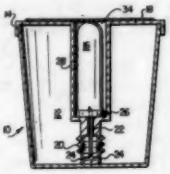
and a second sealing surface in the side and end walls and disposed above the first surface for supporting the imperforate removable film.

4,927,605

SPECIMEN COLLECTION AND SAMPLING CONTAINER

Gordon L. Dorn, Dallas, and Michael A. Johnson, Fort Worth, both of Tex., assignors to Wadley Technologies, Inc., Dallas, Tex.

Filed Apr. 22, 1987, Ser. No. 41,153
Int. Cl.[5] G01N *1/18*
U.S. Cl. 422—102 **57 Claims**



1. A specimen collection container comprising:

a cup positioned and arranged to receive and hold a specimen, the cup having an open top end and a closed bottom end;

a lid positioned and arranged to engage securely with the open top end of the cup,

a main compartment contained within the cup,

at least one sample chamber attached to said container, the at least one sample chamber positioned and arranged to receive an aliquot of specimen from said main compartment;

segregation means for segregating the aliquot into the at least one sample chamber as the lid is closed onto the cup, the segregation means preventing fluid flow between the main compartment and the at least one sample chamber when said aliquot of specimen is being removed from the at least one sample chamber;

a support chamber projecting from the lid, inside the cup and towards the bottom end of the cup when the lid is placed on the cup, an evacuated tube being held within said support chamber; and

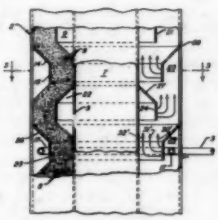
an accordion-shaped shaft connected to the support chamber and holding a needle, the shaft contacting the bottom of the cup when the lid is closed on the cup.

4,927,606

FCC STRIPPING APPARATUS

Ismail B. Cetinkaya, Palatine, and Robert P. Culler, Clarendon Hills, both of Ill., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 867,972, May 29, 1986, abandoned. This application Nov. 6, 1987, Ser. No. 101,225
Int. Cl.[5] B01J *8/24, 8/44*
U.S. Cl. 422—144 **4 Claims**



3. A stripping apparatus for an FCC unit that removes hydrocarbons from particulate catalyst by contact with a stripping gas, said apparatus comprising:

(a) a vessel having an elongated shape, a principally vertical orientation, a transverse cross-section open to downward catalyst flow, an uppermost end in communication with a source of catalyst particles and a lowermost end in communication with a means for withdrawing catalyst particles;

(b) at least two grids located in and extending downwardly and inwardly from opposite vertical sides of the vessel, each grid extending inwardly over at least about half of said transverse cross-section such that together said grids substantially cover said transverse cross-section, and said grids being offset vertically to provide a flow path for a stream of catalyst to flow downwardly through said vessel;

(c) means for adding stripping gas to said vessel below the lowermost of said grids;

(d) a vertical skirt attached to the bottom of each grid, said grid, skirt, and vessel forming a gas collection space underneath each grid for receiving stripping gas; and

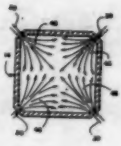
(e) at least two sets of apertures defined in each grid skirt, each set of apertures having apertures of a uniform size, a uniform spacing between apertures, and a common vertical elevation for all apertures associated therewith, each aperture in each set having a horizontal centerline projection and a diameter of restricted size to produce a gas jet that extends into said flow path with the apertures in the lowermost aperture set on each skirt having the largest diameter so that the apertures of the lowermost aperture set will produce the longest jet length.

4,927,607

NON-CYLINDRICAL REACTOR FOR CARBON BLACK PRODUCTION

Alan C. Berg, and William R. Jones, Jr., both of Monroe, La., assignors to Columbian Chemicals Company, Atlanta, Ga.

Filed Jan. 11, 1988, Ser. No. 142,478
Int. Cl.[5] B01J 10/00; C09C 1/48
U.S. Cl. 422—150 10 Claims



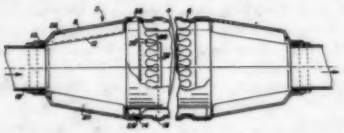
1. Apparatus for the production of carbon black, comprising:
means for producing a flow of hot gas;
a reaction chamber having an inlet opening receiving the flow of hot gas and having an outlet opening so that the hot gas can flow through the reaction chamber,
means positioned between the inlet opening and the outlet to opening of the reaction chamber for introducing a plurality of feedstock hydrocarbon sprays into the reaction chamber substantially transversely to the hot gas flow to form a non-circular feedstock hydrocarbon spray pattern at a cross-section of the reaction chamber; and,
said reaction chamber being shaped and said spray means being positioned within the reaction chamber such that the feedstock hydrocarbon spray pattern formed extends substantially across the entire cross-sectional flow area of the reaction chamber and is not circular in cross-section, so as to maximize coverage of the cross-sectional area of the hot gas flow by the feedstock hydrocarbon spray.

4,927,608

DEVICE FOR CATALYTIC CLEANING OF MOTOR VEHICLE EXHAUST GASES

Siegfried Wörner, Esslingen; Peter Zacke, Albertshausen, and Georg Wirth, Kirchheim, all of Fed. Rep. of Germany, assignors to J. Eberspächer, Esslingen, Fed. Rep. of Germany

Filed Dec. 31, 1987, Ser. No. 139,904
Claims priority, application Fed. Rep. of Germany, Jan. 2, 1987, 3700070
Int. Cl.[5] F01N 3/15
U.S. Cl. 422—179 10 Claims



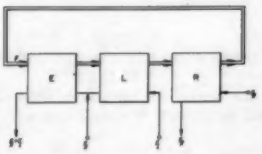
1. A device for cleaning gases exiting from a vehicle motor exhaust pipe, comprising an outer tubular housing having a first connection portion at one end and a second connection portion at the other end, each connection portion positioned and arranged to overlie and be connected to a part of the exhaust pipe; first and second transition portions of gradually increasing diameter extending radially outwardly of said first and second connection portions, respectively; a monolith portion connected at each end to each of said first and second transition portions at ends which are each remote from said first and second connection portions, respectively; a monolith in said monolith portion having a catalytically active coating and an end face; an inner shell of a temperature resistant plate metal in said housing spaced radially inwardly of the interior of said housing in each of said first and second transition portions, a spacer matting positioned between the interior of said housing and said monolith and comprising a material permitting variable thermal expansion of said housing and said monolith, said spacer matting having a side face protected by a protective layer, said inner shell having at least one end portion extending into said monolith portion with a base portion connected to said tubular housing and an end face portion overlapping portions of the monolith end face to maintain the monolith in position, securing means securing said inner shell base portion to said tubular housing at said monolith portion, said inner shell having another end portion adjacent said first and second connection portions which are free for thermal expansion.

4,927,609

RECOVERY OF GALLIUM/RARE EARTH VALUES FROM OXIDE MIXTURES THEREOF

Alain Leveque, Paris, and Michel Triollier, Gouvieux, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Continuation of Ser. No. 670,061, Nov. 9, 1984, abandoned, which is a continuation-in-part of Ser. No. 360,559, Mar. 22, 1982, abandoned, which is a continuation of Ser. No. 162,492, Jun. 24, 1980, abandoned. This application Sep. 5, 1985, Ser. No. 772,672
Claims priority, application France, Jul. 3, 1979, 79 17212
Int. Cl.[5] C01F 17/00
U.S. Cl. 423—21.5 81 Claims



1. A process for the recovery of gallium and rare earth values from mixtures of the oxides thereof, comprising:
(i) acidulating and dissolving such admixtures in a chloride acidic medium;
(ii) liquid/liquid extracting the solution which results with a water-insoluble organic extraction agent into an aqueous phase and an organic phase, whereby said gallium values are preferentially transferred from said aqueous phase into said organic phase; and
(iii) recovering said gallium and said rare earth values from the respective phases comprising same.

4,927,610

METHOD FOR EXTRACTING COPPER, SILVER AND RELATED METALS

Bruce A. Moyer, Oak Ridge, and W. J. McDowell, Knoxville, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Continuation-in-part of Ser. No. 111,490, Oct. 23, 1987, abandoned. This application Jul. 1, 1988, Ser. No. 214,814
Int. Cl.[5] B01D 11/00
U.S. Cl. 423—24 3 Claims

1. A process for selectively extracting copper and silver from aqueous solution comprising:
contacting said aqueous solution containing copper and silver with an organic solvent mixture of a first organic reagent and a second organic reagent, said first reagent being a tetrathiamacrocycle and said second organic reagent being an organic acid that will exchange a proton for

metal cations corresponding to metals of said aqueous solution, said organic acid having a sufficient molecular weight of about 300 or more so that neither its salts nor its adducts will crystallize, resulting in a metal complex with said organic reagents that is soluble in a resulting organic phase but not in a resulting aqueous phase;

separating said organic phase from said aqueous phase; and

dissociating said copper and silver from said organic phase.

4,927,611

LIGHTWEIGHT MAGNESIA CLINKER AND PROCESS FOR THE PREPARATION OF THE SAME

Kosei Yamamoto; Akira Kaneyasu, and Toshiichi Iwamoto, all of Ube, Japan, assignors to UBE Chemical Industries, LTD., Yamaguchi, Japan

Filed Jun. 15, 1988, Ser. No. 207,142

Claims priority, application Japan, Jun. 15, 1987, 62-149741

Int. Cl.[5] C01F *5/06, 5/08, 5/12*

U.S. Cl. 423—155 **9 Claims**

1. A process for the preparation of a lightweight magnesia clinker which comprises the steps of granulating a mixture of a magnesium oxide-forming component having a particle size distribution such that the 100-mesh sieve residue is less than 5 wt.%, a powder combustible pore-forming material in an amount of 10 to 40 parts by weight based on 100 parts by weight of the magnesium oxide-forming component and a magnesium salt in an amount of 1 to 15 wt.% of the total weight of the magnesium oxide-forming component and the powder combustible pore-forming material to form particles having an average diameter of smaller than 3 mm, and firing the particulate mixture at a temperature of 1,300° to 1,600° C.

4,927,612

REDUCTION OF NITROGEN- AND CARBON-BASED POLLUTANTS

Wayne E. Bowers, Clearwater, Fla., assignor to Fuel Tech, Inc., Stamford, Conn.

Division of Ser. No. 906,671, Sep. 10, 1986, Pat. No. 4,751,065, which is a continuation of Ser. No. 811,532, Dec. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 784,827, Oct. 4, 1985, abandoned. This application Jun. 2, 1988, Ser. No. 201,546

The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.[5] C01B *21/00*

U.S. Cl. 423—235 **8 Claims**

1. A process for reducing the concentration of nitrogen oxides in an oxygen-rich effluent from the combustion of a carbonaceous fuel, which process comprises injecting a solution comprising at least one additive compound selected from the group consisting of guanidine, guanidine carbonate, biguanide, guanylurea sulfate, melamine, dicyandiamide, biuret, 1,1'-azobisformamide, methylol urea, methylol urea-urea condensation product, dimethylol urea, methyl urea, and dimethyl urea, at a concentration and a temperature effective to achieve reduction in nitrogen oxide levels in the effluent.

4,927,613

PROCESS FOR REMOVING A CONSTITUENT FROM A HOT GAS STREAM BY EXOTHERMIC IONIC REACTION OF THE CONSTITUENT WITH A REACTANT PROVIDED IN FINE PARTICULATE FORM

Sirpa Hämiläi, Tampere; Matti Heikkilä, Helsinki; Jouko Laine, Tampere; Kari Kokkonen, Tampere, and Timo Kenakkala, Tampere, all of Finland, assignors to Oy Tampella AB, Tampere, Finland

Continuation of Ser. No. 191,973, May 9, 1988, abandoned. This application Oct. 4, 1989, Ser. No. 418,818

Claims priority, application Finland, May 11, 1987, 872072

Int. Cl.[5] B01J *8/00*

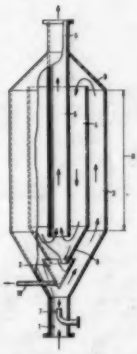
U.S. Cl. 423—244 **16 Claims**

1. A process for removing a constituent from a hot gas stream by exothermic ionic reaction of the constituent with a reactant provided in fine particulate form, comprising the steps of:

(a) providing a flowing hot gas stream containing, in fine particulate form, a reactant capable of reacting with a constituent of the hot gas stream in an exothermic ionic reaction;

(b) while directing the flowing hot gas stream upwardly, introducing droplets of water thereinto so that the water droplets, while being borne upwardly in the hot gas stream, evaporate in major proportion, thereby coating said particulate reactant and humidifying the flowing hot gas stream, and thereby providing a flowing cooled and humidified gas stream;

(c) subjecting the cooled and humidified gas stream to a plurality of episodes of turbulence, each successive two of said episodes of turbulence being separated by a respective interval of substantially laminar, vertical flow and thereafter vertical downward laminar flow thereby causing said



reactant in fine particulate form and water droplets remaining after partial evaporation as a result of step (b), to impinge upon one another thereby producing in said cooled and humidified gas stream, aqueous film-covered particles of said reactant, in which film an exothermic ionic reaction proceeds between said constituent and said reactant, at least one of said episodes of turbulence being caused by abruptly reversing flow direction of said flowing gas stream;

(d) directing the resulting gas stream to flow in continued contact with said aqueous film-covered particles, whereby heat of reaction from said exothermic ionic reaction evaporates said aqueous film into said gas stream, whereby chemically reacted particles in which said constituent have been consumed may be removed from the gas stream for purifying the gas stream of said constituent; and

(e) recovering said chemically reacted particles from the gas stream.

4,927,614

PROCESS FOR GROWING BERLINITE CRYSTALS

Horst G. Langer, Wayland, Mass., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 19, 1988, Ser. No. 157,840

Int. Cl.[5] C01B *25/36*

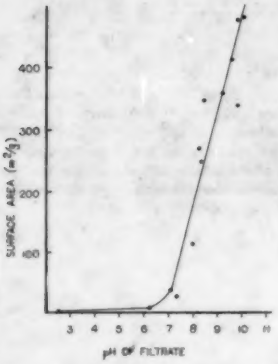
U.S. Cl. 423—305 **3 Claims**

1. A process for growing crystals of berlinite, comprising the steps of:

(a) preparing in an organic solvent an organoaluminum phosphate organogel, characterized by an OH:Al ratio less than or equal to 2;

(b) heating the thus-prepared organoaluminum phosphate

organogel in an organic solvent at a temperature sufficient to slowly and continuously remove water from the organoaluminum phosphate organogel and to cause precipitation and growth of berlinite crystals and



(c) recovering the thus-produced berlinite crystals, carried out in the presence of a dopant comprising a Group IVB metal compound.

4,927,615

CRYSTALLINE SODIUM/ALUMINUM ACID PHOSPHATES

Paul Michel, Lyons, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed Oct. 21, 1988, Ser. No. 260,719
Claims priority, application France, Oct. 21, 1987, 87 14520
Int. Cl.[5] C01B *15/16, 25/26*
U.S. Cl. 423—305 **15 Claims**

1. A process for the preparation of a crystalline aluminum and sodium acid phosphate having the following general formula:

$$Na_aAl_bH_c(PO_4)_d \cdot n\ H_2O$$

wherein a ranges from 0.6 to 3.3, b ranges from 1.8 to 3.3, c ranges from 12 to 16, d ranges from 7 to 9, and n ranges from 0 to 5, with the proviso that $a+3b+c=3d$, comprising coating and drying an atomized precursor solution of such acid phosphate on inert solid particles which comprise a fluidized bed thereof.

4,927,616

PREPARATION OF SILANE AND AMINE ALANES

Everett M. Marlett, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Oct. 2, 1989, Ser. No. 416,042
The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.
Int. Cl.[5] C01B *33/04, 9/08; C07F 5/06*
U.S. Cl. 423—347 **43 Claims**

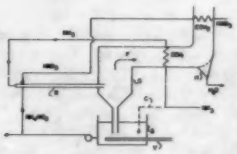
1. A process which comprises reacting
a. tertiary ammonium trichlorosilyl,
b. a complexing tertiary amine, and
c. an alkali metal aluminum tetrahydride, in molar proportion a:b:c of about 1:2:3, said process being conducted in a liquid reaction medium, such that silane and tertiary amine alane are produced.

4,927,617

PROCESS OF PRODUCING CONCENTRATED SOLUTIONS OF AMMONIUM NITRATE

Alexandre Villard, and Yves Cotonea, both of Rouen, France, assignors to Societe Chimique des Charbonnages S.A., Paris, France

Filed Mar. 2, 1987, Ser. No. 20,770
Int. Cl.[5] C06B *1/04*
U.S. Cl. 423—396 **4 Claims**



1. Process for producing concentrated solutions of ammonium nitrate which comprises neutralizing nitric acid with ammonia in a substantially horizontal pipe reactor containing no packing wherein the global flow of reactants is less than 150 kg/h/cm^2 and a recycled flow of ammonium nitrate solution is present having a recycling ratio ranging between 1:1 and 5:1.

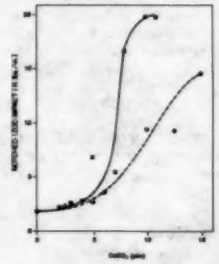
3. Process for producing concentrated solutions of ammonium nitrate which comprises neutralizing nitric acid with ammonia in a substantially horizontal pipe reactor containing no packing wherein the global flow of reactants is greater than 150 kg/h/cm^2 and no recycling of ammonium nitrate solution is carried out.

4,927,618

PROCESS FOR THE PREPARATION OF LARGE SURFACE AREA, FINELY DIVIDED PRECIPITATED CALCIUM CARBONATE AND FILLED POLYMERIC COMPOSITIONS OF MATTER CONTAINING SAID CALCIUM CARBONATE

Krishna K. Mathur; Robert F. Resnik, both of Easton, Pa., and Randall G. Simmons, San Jose, Calif., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 123,037, Nov. 19, 1987, abandoned. This application Jun. 7, 1988, Ser. No. 204,057
Int. Cl.[5] C01F *5/24, 11/18*
U.S. Cl. 423—432 **12 Claims**



1. A process for the preparation of precipitated calcium carbonate which comprises introducing carbon dioxide into an aqueous slurry of calcium hydroxide containing anionic organopolyphosphonate polyelectrolyte present in the amount of from about 0.02 to about 1.0 weight percent based on the calcium carbonate equivalent of said hydroxide, the concentra-

tion of said hydroxide in said slurry being greater than about 5 weight percent, starting said introduction at a temperature above about 7° C. and below about 18° C., continuing said introduction until calcium carbonate precipitation is substantially complete and adding a polybasic acid selected from the group consisting of maleic, malic, tartaric, citric, malonic, phthalic, boric, sulfuric, aspartic, sulfurous, oxalic, glutaric and phosphoric acids in an amount from about 0.75 to about 4.0 weight percent based on the precipitated calcium carbonate.

4,927,619

DIAMOND SINGLE CRYSTAL

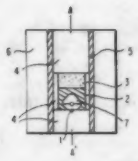
Kazuo Tsuji, Hyogo, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 733,541, Jun. 12, 1985, abandoned, which is a division of Ser. No. 506,935, Jun. 22, 1983, Pat. No. 4,544,540. This application Oct. 11, 1988, Ser. No. 255,249

Claims priority, application Japan, Jun. 25, 1982, 57-110398; Aug. 13, 1982, 57-141505

Int. Cl.[5] C01B *31/06*

U.S. Cl. 423—446 **15 Claims**



1. An artificial diamond single crystal, at least a part of a surface of the crystal having a rough surface which diffusibly reflects light which is formed by suppressing crystal growth at that surface, and wherein said diamond single crystal is obtained by a process consisting essentially of:

providing a diamond synthesis reaction system comprised of a reaction chamber housing having positioned therein a carbon source and a solvent metal arranged in contact with the said carbon source, said reaction system being arranged in a pressure medium;

providing a seed crystal in the reaction chamber;

providing temperatures of from about 1300° to 1600° C. and pressure of from about 50 to 60 Kb in the reaction chamber which permit diamond to be maintained thermodynamically stable in the reaction chamber housing;

heating the reaction chamber to provide a temperature gradient in such a way that a portion of the solvent metal in contact with the carbon source is higher in temperature than a portion of the solvent metal in contact with the seed crystal so as to migrate the carbon from the higher temperature portion to the lower temperature portion using the solvent metal as a medium; and

allowing the carbon to precipitate and grow as a diamond on the seed crystal due to the difference in solubility caused by the temperature gradient in the reaction chamber housing;

the crystal growth being maintained for about 10 to 100 hours until the crystal growth in the reaction chamber housing in at least one direction perpendicular to the direction of the temperature gradient reaches the contact surface of the solvent metal with the pressure medium having an irregular rough surface and thereby the crystal growth is suppressed at the surface of the pressure medium to thereby form an irregular rough surface on the crystal.

4,927,620

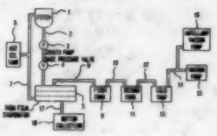
PROCESS FOR THE MANUFACTURE OF CARBON FIBERS AND FEEDSTOCK THEREFOR

Clifford Ward, Louisa; Eugene Chao, Ashland, both of Ky.; Roy E. Booth, Duncanville, Tex.; Frank H. Turrill, Huntington, W. Va.; Robert H. Wombles, Worthington, Ky.; John W. Newman, Ashland, Ky., and William P. Hettinger, Jr., Russell, Ky., assignors to Ashland Oil, Inc., Ashland, Ky.

Continuation-in-part of Ser. No. 549,115, Nov. 7, 1983, abandoned, which is a continuation of Ser. No. 446,535, Dec. 3, 1982, Pat. No. 4,497,789, which is a continuation-in-part of Ser. No. 331,443, Dec. 14, 1981, abandoned, which is a continuation-in-part of Ser. No. 963,080, Nov. 22, 1978, abandoned, which is a continuation-in-part of Ser. No. 963,232, Nov. 22, 1978, abandoned, which is a continuation of Ser. No. 838,900, Oct. 3, 1977, abandoned. This application Oct. 21, 1985, Ser. No. 789,590

Int. Cl.[5] D01F *9/12*

U.S. Cl. 423—447.2 **15 Claims**



1. A process for preparing carbon fibers from a catalytic pitch which consists essentially of:

(a) solvent extracting said catalytic pitch to selectively remove therefrom low molecular weight compounds, said solvent extraction being characterized in that it is performed under sufficiently mild time-temperature conditions such that;

(i) the mesophase content of said pitch is not significantly increased and is maintained below 5%, and

(ii) alkyl groups attached to aromatic compounds are not preferentially removed from said pitch,

(b) recovering from step (a) a fiber precursor pitch having the following properties:

Property	Value
Wt % of aromatic compounds	At least about 95
Wt % of aromatic carbon atoms	At least about 85
Total aliphatic hydrogen atoms, mol % of total hydrogen atoms	25–65
Aliphatic alpha hydrogen atoms, mol % of total hydrogen atoms	20–40
Aliphatic beta hydrogen atoms, mol % of total hydrogen atoms	2–15
Aliphatic gamma hydrogen atoms, mol % of total hydrogen atoms	1–10
Carbon/hydrogen atomic ratio	At least about 1.5
Wt % xylene insolubles	15–40
Wt % quinoline insolubles	Less than about 5
Wt % coking value	65–90
Softening point, °C.	At least about 240
% Mesophase	Less than about 5
Glass transition temp., °C.	160–220
Wt % ash	Less than about 0.1

(c) converting the fiber precursor pitch of step (b) into fibers;

(d) stabilizing the fibers of step (c) by heating them in an atmosphere containing an oxidizing gas at a temperature close to, but at least 5° C. below, the glass transition temperature of the fibers;

(e) transferring the stabilized fibers of step (d) into a zone substantially free of an oxidizing gas, and heating said fibers to a temperature of at least about 1000° C. for a

period of time sufficient to increase the fixed carbon content of said fibers to at least about 90 weight %; and

(f) recovering the carbon fibers from step (e); the catalytic pitch employed in step (a) having the following properties:

Property	Value
Softening point, °C.	About 40-130° C.
Wt % xylene insolubles	Less than about 8
Wt % quinoline insolubles	Nil
Wt % coking value	Less than about 48
Carbon/hydrogen atomic ratio	Greater than about 1.2
% Mesophase	Less than about 5
Glass transition temp., °C.	Greater than about 35
Wt % ash	Less than about 0.1

4,927,621

PURIFICATION OF ANHYDROUS HYDROGEN CHLORIDE

Joseph F. Repman, Angleton; Thomas E. Morris, and Thomas F. Hill, Jr., both of Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 27, 1989, Ser. No. 303,513
Int. Cl.[5] C01B 7/07; B01D 3/00
U.S. Cl. 423—488 46 Claims

1. A method to purify impure gaseous hydrogen chloride containing an unsaturated chlorinated hydrocarbon in an amount less than that necessary to inhibit purification, comprising exposing the impure hydrogen chloride to an ultraviolet light source in the presence of gaseous chlorine for a sufficient time for the gaseous chlorine to react with organic impurities in the hydrogen chloride to form organic compounds heavier than the impurities and thereafter separating the heavier compounds from the hydrogen chloride.

4,927,622

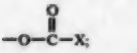
PROCESS FOR PRODUCING ZIRCONIUM BASED GRANULES

Sivananda S. Jade, Englewood, Colo., assignor to Manville Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 65,809, Jun. 19, 1987, abandoned. This application Dec. 11, 1987, Ser. No. 131,594
Int. Cl.[5] C01G 25/02
U.S. Cl. 423—608 4 Claims

1. A process for the production of amorphous zirconium based granules, said process consisting essentially of the steps of:

(a) adding about 2–15 wt % of a suitable phase stabilizer to an aqueous solution, based upon the total weight of ZrO_2 in solution, comprising a compound of the formula $Zr(R)_4$, wherein each R is individually selected from the group consisting of



—OX; —NO_3, halogen; —OH, or OY and X represents a C_1–C_{10} hydrocarbyl group and Y represents a halogen, to produce an aqueous solution having a pH in the range of about 4 to 7 comprising a zirconium based complex and phase stabilizer and thereafter;

(b) drying said aqueous solution comprising said zirconium based complex and said phase stabilizer at a temperature below about 180° C. for a time a sufficient to evaporate said aqueous solution thereby forming amorphous zirconium based granules containing said phase stabilizer.

4,927,623

DISSOLUTION OF GAS IN A FLUOROCARBON LIQUID

David M. Long, Jr., San Diego, Calif., assignor to Alliance Pharmaceutical Corp., San Diego, Calif.

Continuation-in-part of Ser. No. 818,690, Jan. 14, 1986, Pat. No. 4,865,836, which is a continuation-in-part of Ser. No. 82,846, Aug. 5, 1987. This application Jan. 4, 1988, Ser. No. 140,543
Int. Cl.[5] A61K 49/04, 47/00
U.S. Cl. 424—5 11 Claims

1. A method of dissolving a gas in a fluorocarbon emulsion comprising:

a. providing a first flexible container that is permeable to gas, but not to liquids or solids, in contact with the interior of a second container, said first and said second containers having means for introducing and removing fluid;

b. providing a fluorocarbon emulsion in one of said containers;

c. inserting said gas to be dissolved into the other of said containers and allowing the gas to permeate said one container to provide an oxygenated fluorocarbon emulsion in said one container.

4,927,624

CLAY MAGNETIC RESONANCE CONTRAST AGENTS FOR GASTROINTESTINAL COMSUMPTION OR INTRODUCTION

Robert G. Bryant, Pittsford, and Jay J. Listinsky, Rochester, both of N.Y., assignors to The University of Rochester, Rochester, N.Y.

Filed Nov. 19, 1987, Ser. No. 123,007
Int. Cl.[5] A61K 49/00; G01N 24/00
U.S. Cl. 424—9 7 Claims

1. In the method of nuclear magnetic resonance imaging of the gastrointestinal tract involving administering a contrast agent, the improvement comprising the oral or rectal administration of a contrast agent consisting essentially of a suspension of clay mineral in water.

4,927,625

TOOTHPASTES

Ralph M. Duckworth, Kelsall, England, assignor to Lever Brothers Company, New York, N.Y.

Filed Aug. 18, 1988, Ser. No. 233,693
Claims priority, application United Kingdom, Aug. 21, 1987, 8719775
Int. Cl.[5] A61K 7/16, 7/18
U.S. Cl. 424—52 10 Claims

1. A toothpaste comprising about 5 to about 75% by weight of an abrasive cleaning agent, an oral therapeutic agent which is a source of fluoride ions present in an effective amount to inhibit caries, 0.01 to 0.05% by weight of a flavouring agent, 0.002 to 0.01% by weight of a sweetening agent and 0.075 to 1.5% by weight of an anionic surfactant, the amount of said flavouring and sweetening agent being sufficiently low to reduce their normal stimulatory effect upon salivary flow.

4,927,626

METHOD FOR ENHANCEMENT OF UNGUIS GROWTH

Richard L. DeVillez, 930 Forrest Dr., Kalamazoo, Mich. 49002, and Richard K. Scher, 913 Gardiner Dr., P.O. Box P107, Bay Shore, N.Y. 11706

Filed Oct. 28, 1988, Ser. No. 264,470
Int. Cl.[5] A61K 7/04, 9/12
U.S. Cl. 424—61 5 Claims

1. A method for enhancing the growth of unguis in animals including humans comprising:

topically applying to a region of the unguis where it emerges from the skin an effective amount of minoxidil.

4,927,627

EMULSION-FORM HYDROGEN PEROXIDE PREPARATIONS FOR THE BLEACHING AND OXIDATIVE DYEING OF HAIR

Dieter Schrader, Duesseldorf, and Winifried Neuhaus, Mettmann, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,875

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732147

Int. Cl.[5] A61K *7/135, 7/13*

U.S. Cl. 424—62 25 Claims

1. An oil-in-water emulsion suitable for use as a component in hair dyeing and hair bleaching preparations comprising a mixture of:

(a) an oily component selected from the group consisting of oils, fatty alcohols, and mixtures thereof;

(b) one or more emulsifiers selected from the group consisting of anionic, zwitterionic and nonionic surfactants, and mixtures thereof;

(c) hydrogen peroxide;

(d) a thickening agent selected from the group consisting of polymers and copolymers containing carboxyl groups and soluble in aqueous alkali; and

(e) water;

said emulsion having a viscosity within the range of about 0.5 to about 2 Pa.s as measured at 20° C. and at a shear rate of about 3 to about 6 cm^{-1}.

4,927,628

VACCINE AGAINST ROTAVIRUS DISEASES AND METHOD OF PREPARING SAME

Robert M. Chanock, Bethesda; Albert Kapikian, Rockville, both of Md.; Karen Midthun, Washington, D.C.; Jorge Flores, Bethesda, Md.; Mario Gorziglia, Silver Spring, Md.; Yasutaka Hoshino, Bethesda, Md., and Irene Peres-Schael, San Jose, Venezuela, assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Sep. 21, 1987, Ser. No. 98,977

Int. Cl.[5] A61K *39/12;* C12N *15/00, 7/00*

U.S. Cl. 424—89 2 Claims

1. A method for producing a vaccine against rotavirus disease, consisting essentially of:

(a) isolating a rotavirus from humans having undergone asymptomatic rotaviral infection;

(b) analyzing the isolated virus obtained from step (a) by confirming the presence of the desired fourth rotaviral gene associated with rotaviral attenuation;

(c) growing a purified inoculum of the isolated rotavirus, carrying the fourth gene, in cells acceptable for use in vaccine for human administration; and

(d) employing an immunogenic amount of the rotavirus infected cells of step (c) as a vaccine in a pharmaceutically acceptable carrier.

4,927,629

RELAXATION OF SMOOTH VASCULAR MUSCLE

Richard J. Bing, La Canada, Calif., assignor to Huntington Medical Research Institutes, Pasadena, Calif.

Filed Dec. 17, 1987, Ser. No. 134,034

Int. Cl.[5] A61K *37/48*

U.S. Cl. 424—94.6 4 Claims

1. A method for relaxing smooth vascular muscle comprising administering to a living body having a vascular system with an endothelial lining and suffering from vascular contraction in said smooth vascular muscle an effective amount of a pharmacologically-acceptable amount of prospholipase A_2.

4,927,630

TISSUE PLASMINOGEN ACTIVATOR FROM NORMAL HUMAN COLON CELLS

Joseph Feder, University City; Susan C. Howard, Fenton; Arthur J. Wittwer, Ellisville, all of Mo.; Thomas W. Rademacher, Oxford, United Kingdom; Raj B. Parekh, Oxford, United Kingdom, and Raymond A. Dwek, Oxford, United Kingdom, assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 929,950, Nov. 11, 1986, Pat. No. 4,751,084, which is a continuation-in-part of Ser. No. 834,080, Feb. 26, 1986, abandoned. This application Mar. 11, 1988, Ser. No. 167,946

The portion of the term of this patent subsequent to Jun. 14, 2005, has been disclaimed.

Int. Cl.[5] C12N *9/48, 9/50;* A61K *37/547*

U.S. Cl. 424—94.64 3 Claims

1. Human color fibroblast tissue plasminogen activator glycoprotein in which the protein moiety is glycosylated with Type I or Type II glycoforms or mixtures thereof upon separation by affinity chromatography on lysine-Sepharose such that the percent molar ratio of the individual oligosaccharides is about as follows:

Oligosaccharide	Percentage
C-A	1–3
C-B	8–11
C-C-1	9–13
C-C-2	2–4
C-C-3	0–3
C-C-4	0–3
C-D-1	2–6
C-D-2	8–18
C-E	8–14
C-F	4–7
C-G-1	2–7
C-G-2	2–4
C-G-3	3–6
C-H	8–19
C-I	7–15
C-J	2–4.

4,927,631

DECONGESTANT PREPARATION

Harry L. Bates, 311 West Ave., Elmira, N.Y. 14904

Continuation-in-part of Ser. No. 935,937, Nov. 28, 1986, abandoned. This application Feb. 16, 1989, Ser. No. 311,983

Int. Cl.[5] A61K *35/78*

U.S. Cl. 424—195.1 6 Claims

1. A decongestant preparation comprising a set of active components and a petrolatum base wherein said active components consist essentially of menthol, camphor, eucalyptus oil, and spirits of turpentine, wherein the total concentration of said active components is no greater than about 1.0% by weight of said decongestant preparation, and wherein said set of active components consists essentially of in percent by weight from about 15 to about 25 menthol, from about 30 to about 40 camphor, from about 5 to about 10 eucalyptus oil, and from abut 30 to about 40 spirits of turpentine, said decongestant being suitable for direct application to the nasal cavity.

4,927,632

SELECTIVE PULSED DRUG DELIVERY SYSTEM

Patrick S.-L. Wong, Hayward, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 878,947, Jun. 26, 1986, Pat. No. 4,786,500. This application Jun. 29, 1988, Ser. No. 213,215

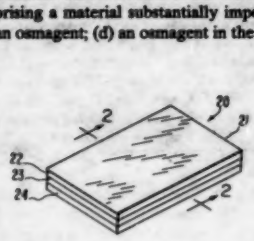
The portion of the term of this patent subsequent to Nov. 22, 2006, has been disclaimed.

Int. Cl.[5] A61M *31/00*

U.S. Cl. 424—422 2 Claims

1. A delivery system for delivering a beneficial drug at a

controlled rate to a biological environment, wherein the delivery system comprises: (a) a reservoir dimensioned for use and retention in the biological environment, the reservoir comprising a polymeric formulation that permits the passage of drug; (b) a beneficial drug in the reservoir; (c) a first membrane in contacting relation with a surface of the reservoir, the membrane comprising a material substantially impermeable to the passage of an osmagent; (d) an osmagent in the first membrane



in contacting relation with a surface of the reservoir; (e) a second membrane in contact with a different surface of the reservoir, the second membrane comprising a material substantially impermeable to the passage of an osmagent; and (f) an osmagent in the second membrane in contacting relation with a different surface of the reservoir, and wherein, when the delivery system is in operation in the biological environment, beneficial drug is released by the formation of osmotically-bursting apertures in (c) and (e).

4,927,633

DISPENSER FOR DELIVERING DRUG TO LIVESTOCK

James B. Eckenhoff, Los Altos; Richard Cortese, Los Gatos, and Felix A. Landran, Milpitas, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 902,916, Sep. 2, 1986, Pat. No. 4,729,793, which is a continuation-in-part of Ser. No. 764,143, Aug. 9, 1985, Pat. No. 4,624,945, which is a continuation-in-part of Ser. No. 590,778, Mar. 19, 1984, Pat. No. 4,595,583. This application Jun. 24, 1987, Ser. No. 66,674

The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.

Int. Cl.[5] A61K *9/22*; A61M *31/00*

U.S. Cl. 424—438 **37 Claims**

1. A dispensing device for delivering a beneficial agent formulation to an environment of use, the dispensing device comprising

(a) a wall that defines an internal space, said wall comprising in at least a part a composition that permits the passage of fluid;

(b) a beneficial agent formulation in the space, said formulation comprising selenium;

(c) an expandable composition in the space for urging the beneficial agent formulation from the device;

(d) a layer of a composition comprising means for maintaining the identity of the beneficial agent formulation and the expandable composition in the space between the beneficial agent formulation and the expandable composition;

(e) a density member in the space comprising a density for maintaining the device in the environment of use; and

(f) exit means in the wall for dispensing the beneficial selenium to the environment of use over time.

4,927,634

PHARMACEUTICAL COMPOSITIONS CONTAINING DYCLONINE HCl AND PHENOL

James V. Sorrentino, Wilton; William J. Kelleher, Storrs, and Jeanne O. Moye, Fairfield, all of Conn., assignors to Richardson-Vicks Inc., Wilton, Conn.

Continuation of Ser. No. 133,834, Dec. 16, 1987, Pat. No. 4,808,410. This application Jan. 13, 1989, Ser. No. 297,450

Int. Cl.[5] A61N *25/00*

U.S. Cl. 424—405 **1 Claim**

1. A pharmaceutical composition of matter having enhanced antimicrobial action comprising from about 0.02 to about 3.0 w/w percent of dyclonine HCl and from about 0.3 to about 5.0 w/w percent of phenol in admixture with a pharmaceutically acceptable aqueous carrier.

4,927,635

DEVICE FOR CONTROLLING STORED FOOD INSECTS

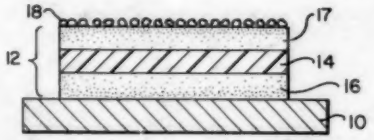
Samuel R. Loschiavo, Winnipeg, Canada, assignor to Canadian Patents & Development Ltd., Ottawa, Canada

Filed Jul. 21, 1988, Ser. No. 222,571

Claims priority, application Canada, Jul. 24, 1987, 543006

Int. Cl.[5] A01N *25/08*

U.S. Cl. 424—409 **8 Claims**



1. A device for controlling stored-food insects, comprising a substrate selected from the group consisting of paper, burlap, cardboard and porous plastic, a layer of non-drying adhesive attached to said substrate and a deposit of silica aerogel particles atop the adhesive layer, the silica aerogel particles being releasable upon the insect contact thereof.

4,927,636

ASSOCIATION COMPLEX COMPRISING PULLULAN AND POLYETHYLENE GLYCOL, AND PREPARATION AND USES OF THE SAME

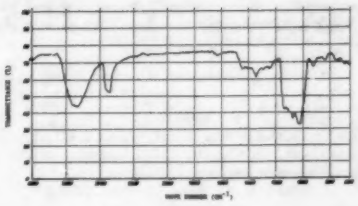
Hiromi Hijiya, and Toshio Miyake, both of Okayama, Japan, assignors to 501 Kabushiki Kaisha Hayashibara Kagaku Kenkyujo, Okayama, Japan

Filed Nov. 3, 1987, Ser. No. 116,329

Claims priority, application Japan, Nov. 11, 1986, 61-268305

Int. Cl.[5] A01N *25/34*; A61K *9/26, 47/00*; C05G *5/06*

U.S. Cl. 424—409 **13 Claims**



1. A complex, comprising pullulan and polyethylene glycol associated on a molecular level via hydrogen bonds and having a decreased water solubility with respect to the water solubility of said pullulan and said polyethylene glycol, said polyethylene glycol having a molecular weight in the range of about 200–10,000, and wherein the amount of polyethylene glycol is

in the range of 0.01–100 parts by weight with respect to one part by weight of pullulan, based on the dry solid.

13. The product of claim 12 in the form of a gradually disintegrable- or sustained release-shaped product.

4,927,637

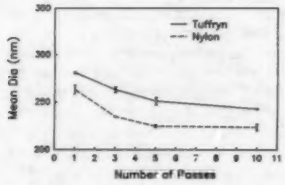
LIPOSOME EXTRUSION METHOD

Jacqueline K. Morano, Mountain View; Francis J. Martin, San Francisco, and Martin Woodle, Menlo Park, all of Calif., assignors to Liposome Technology, Inc., Menlo Park, Calif.

Filed Jan. 17, 1989, Ser. No. 297,946

Int. Cl.[5] A61K *37/22*

U.S. Cl. 424—450 7 Claims



1. A method of producing a suspension of liposomes which have uniform sizes and a selected average size in the size range between about 0.1 and 0.4 microns, said method comprising

providing a suspension of heterogeneous-size liposomes containing a substantial portion with sizes greater than 1.0 micron, and

passing the suspension through a polymer membrane filter characterized by:

(a) a web-like construction providing a network of interconnected, tortuous-path capillary pores;

(b) a membrane thickness of at least about 100 microns; and

(c) a membrane pore size rating which is approximately the same as the selected average size of the liposomes.

4,927,638

ETOPOSIDE SOLUTIONS

Gururaj Bykadi, Phoenix, Ariz.; Murray A. Kaplan, Syracuse, N.Y.; Richard G. Corrao, Syracuse, N.Y.; Edward J. Bara, Syracuse, N.Y.; Ismat Ullah, Liverpool, N.Y., and Shreeram N. Agharkar, Fayetteville, N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 916,599, Oct. 8, 1986, abandoned. This application Sep. 12, 1988, Ser. No. 243,392

Int. Cl.[5] A61K *9/66, 9/08;* C07H *15/20*

U.S. Cl. 424—455 35 Claims

1. An etoposide solution comprising etoposide in dimethylisosorbide.

4,927,639

MODIFIED RELEASE GEMFIBROZIL COMPOSITION

Isaac Ghebre-Sellassie, Stanhope; Robert H. Gordon, Dover, and Sadath U. Khan, Mine Hill, all of N.J., assignors to Warner-Lambert Company, Ann Arbor, Mich.

Filed Feb. 2, 1989, Ser. No. 305,082

Int. Cl.[5] A61K *9/16*

U.S. Cl. 424—497 11 Claims

1. A disintegratable formulation of gemfibrozil providing both immediate and sustained release and comprising a tablet compressed from a mixture of (i) a first granulation, (ii) a second granulation, and (iii) a disintegration excipient operable to effect partial or complete disintegration in the stomach, said first and second granulations being present in a ratio of each to the other of from about 10:1 to about 1:10, respectively, said first granulation comprising finely divided particles of pure gemfibrozil granulated with at least one cellulose derivative and said second granulation comprising finely divided particles of pure gemfibrozil granulated with a pharmaceutically acceptable water soluble or insoluble polymer, said second granulation being uniformly coated with a water insoluble material prior to admixture with said first granulation.

4,927,640

CONTROLLED RELEASE BEADS HAVING GLASS OR SILICON DIOXIDE CORE

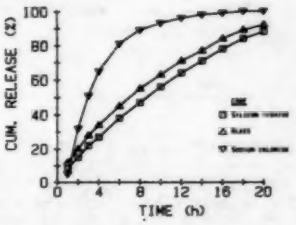
Lars-Erik D. Dahlinder, Mölndal; Mats O. Johansson, Göteborg; John A. Sandberg, Mölndal, and Sjö, Mönlycke, all of, Sweden, assignors to Aktiebolaget Hassle, Molndal, Sweden

Filed Sep. 12, 1986, Ser. No. 907,599

Claims priority, application Sweden, Oct. 11, 1985, 8504720

Int. Cl.[5] A61K *9/16*

U.S. Cl. 424—497 10 Claims



1. Controlled release beads, each comprising a compact inert core selected from the group consisting of glass and silicon dioxide which is insoluble in water, physiological fluids and liquids commonly used for intraveneous infusion; a layer applied to the surface of the insoluble core consisting essentially of one or more pharmaceutically active compounds selected from among those compounds for which a non-instant drug release is wanted; and a release controlling polymeric membrane covering the active layer.

4,927,641

VETERINARY LINIMENT AND METHOD

Gerald L. Knight, 13106 McBurnett, Corpus Christi, Tex. 78410

Filed May 23, 1989, Ser. No. 355,352

Int. Cl.[5] A61K *33/14*

U.S. Cl. 424—665 9 Claims

1. A penetrating veterinary liniment comprising from about 1 to 10% by volume of an alkali metal hypochlorite; and from about 5 to 90% by volume DMSO, balance diluent.

4,927,642

APPARATUS FOR WELDING TUBULAR COMPONENTS OF THERMOPLASTIC MATERIAL

Peter Kunz, Schaffhausen, Switzerland, assignor to Georg Fischer AG, Schaffhausen, Switzerland

Filed Aug. 29, 1988, Ser. No. 237,903

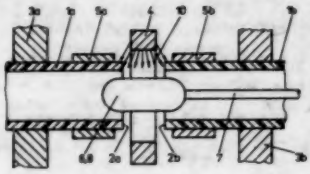
Claims priority, application Switzerland, Sep. 23, 1987, 03680/87

Int. Cl.[5] B29C *65/14;* B28B *21/96*

U.S. Cl. 425—508 3 Claims

1. Apparatus for welding tubular components of thermoplastic material, the tubular components having an axis, ends to be joined facing each other and an inner and an outer circumference, the apparatus comprising bracing devices for holding and moving the tubular components coaxially and toward each other, an annular heating device positioned between the bracing devices for generating radiation heat for heating the spaced-apart ends of the tubular components by radiation heat without contact at the outer circumference thereof at least until the melting point of the thermoplastic material is reached, preheatable support rings slidable toward each other in axial direction on the outer circumference of the tubular components prior to joining the ends of the tubular components, said

support rings positioned intermediate the bracing devices and within the annular heating device, and an expandable support means positioned within the support rings and annular heating



device, said expandable support means capable of being pressed against the inner circumference of the tubular components after the ends of the tubular components have been joined.

4,927,643

SOLUBLE FISH-ATTRACTANT COATING, COATED LURE, AND COATING COMPOSITION AND METHOD

Vincent T. D'Orazio, 5802 Tahoe Dr., Racine, Wis. 53406, and Robert B. O'Brien, 3515 Indiana St., Racine, Wis. 53405

Filed Nov. 23, 1988, Ser. No. 275,418
Int. Cl.[5] A01K *85/00*
U.S. Cl. 426—1 14 Claims

1. A liquid composition for application onto pre-existing fishing lure structures comprising:

a volatile solvent;

a polymer dissolved in the solvent and capable of forming a water-soluble coating upon volatilization of the solvent, the polymer selected from the group consisting of acidic polymers and alkaline polymers;

a neutralizer for the polymer present in an amount sufficient for partial neutralization to render the coating polymer water soluble to an extent; and

an odoriferous fish-attractant material dispersed in the solution, said fish-attractant material being selected from the group consisting of anise oil, fish oil, amino acids, earthworm extract, fish egg extract, fish meal homogenate, and mixtures thereof,

whereby the composition, when applied in liquid form onto a fishing lure structure, solidifies to a substantially continuous film coating thereon which will dissipate in water over time for steady extended release of the fish-attractant material without erosion or breakup of the pre-existing fishing lure structure.

4,927,644

PREFERENTIAL ENTRAINMENT OF ENZYMES IN CHEESE CURDS

Michael V. Arbige, Montara, and Scott C. Silver, Belmont, both of Calif., assignors to Genencor, Inc., South San Francisco, Calif.

Continuation-in-part of Ser. No. 689,867, Jan. 9, 1985, abandoned. This application Jun. 25, 1987, Ser. No. 67,664
Int. Cl.[5] A23C *19/032, 19/05*
U.S. Cl. 426—35 4 Claims

1. A process for improving the amount of protease or lipase which is entrained into cheese curds from milk comprising:

(a) selecting insoluble particles having a size of at least about 0.20 microns; said particles consisting essentially of a protease or lipase enzyme from a microbial source;

(b) adding to milk an amount of the selected protease or lipase particles sufficient to achieve the desired entrainment of the particles in the cheese curds; and

(c) forming curds and whey from the milk of step (b).

4,927,645

PROCESS FOR MAKING CANDY COATED SNACK FOODS SUCH AS POPCORN

Yanien Lee, Manlius, N.Y., assignor to Borden, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 909,485, Sep. 19, 1986, abandoned. This application Feb. 21, 1989, Ser. No. 313,048
Int. Cl.[5] A23G *3/00*
U.S. Cl. 426—93 17 Claims

1. A candy bar which displays uniform melting characteristics in a microwave oven and forms a pourable composition that is useful as a coating comprising

a solidified emulsion of shortening, water, an edible emulsifying agent, and a sweetener selected from the group consisting of sugar, corn syrup, corn syrup solids, molasses, and mixtures thereof, said solidified emulsion having a substantially uniform thickness,

the amount of moisture present in the bar being in the range from about 2% to about 10% of said bar by weight,

the amount of emulsifying agent present being from about 1% to about 2% of said bar by weight and sufficient to inhibit the separation of said shortening as the fluid emulsion is cooled and hardened to form said bar, and

the amount of shortening being from about 1% to about 30% of said bar by weight and sufficient to promote uniform melting of said candy bar.

4,927,646

SUCRALOSE SWEETENING COMPOSITION

Michael R. Jenner, Goring-on-Thames, and Graham Jackson, Reading, both of Great Britain, assignors to Tate & Lyle PLC, Great Britain

Filed Nov. 13, 1987, Ser. No. 120,077
Claims priority, application United Kingdom, Nov. 13, 1986, 8627139
Int. Cl.[5] A23L *1/236*
U.S. Cl. 426—96 12 Claims

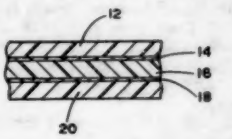
1. A heat stable sweetener concentrate comprising particles of substantially non-crystalline sucralose dispersed evenly throughout, and closely adhering to, a water-soluble glucose oligosaccharide or mixture of said oligosaccharides, the concentrate containing between about 20% and 80% sucralose on a dry weight basis.

4,927,647

ANTI-STICK PACKAGE FOR HYGROSCOPIC FOODS

Jennifer A. Bailey, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Continuation of Ser. No. 73,797, Jul. 13, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 277,464
Int. Cl.[5] A23L *3/00*
U.S. Cl. 426—126 10 Claims

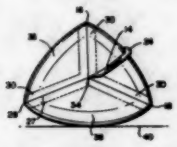


1. A packaged dried fruit candy hygroscopic food stuff comprising a hygroscopic foodstuff contained in a flexible laminated package , said flexible laminated package comprising an inner layer formed of a polystyrene foam film having anti-stick characteristics whereby when placed in said package, said hygroscopic foodstuffs will not adhere to said polystyrene inner layer.

4,927,648
METHOD OF PREPARING POPCORN

Jon A. Ylvisaker, Marietta, N.Y., assignor to Borden, Inc., Columbus, Ohio

Filed Oct. 27, 1989, Ser. No. 427,698
Int. Cl.[5] B65B 29/68; A23L 1/18
U.S. Cl. 426—234 3 Claims



1. A method of preparing popcorn comprising the steps of:

placing a pleated package containing a charge of unpopped popcorn kernels in a microwave oven, said package form from a length of microwave energy transparent sheet material, said sheet material forming said package having longitudinally extending opposed marginal edges, said package comprising two substantially planar opposed faces of said sheet material defining a product-containing chamber and said charge of unpopped popcorn contained therein; two opposed longitudinally extending fold lines in said sheet material joining the longitudinal periphery of said opposed faces; a longitudinally-extending seam intermediate said fold lines, integral with and projecting away from said one of said faces, outside the plane of said one face, said seam comprising a seal between said opposed marginal edges such that said edges are sealed to each other in face to face congruent fashion; and a longitudinally-extending pleat intermediate said fold lines, integral with and projecting away from said face opposite said one of said faces, outside the plane of said opposite face, said pleat comprising an additional fold line in said sheet material and additional opposed faces and foldable to lie against said opposite face,

said package further comprising two opposed transverse seals extending substantially along only the transverse edges of said package to seal the popcorn kernels contained therein, said transverse seals sealing said opposed faces to each other along said transverse edge and sealing said additional opposed faces to each other that constitute said pleat, said sheet material being otherwise unsealed between said opposed faces, said package being placed in said microwave oven such that the pleat is folded against the package and in contact with the oven floor; and then

applying sufficient microwave energy to the charge of unpopped kernels to pop said kernels and cause the release of steam and vapor from the kernels, said additional opposed faces and the orientation and configuration of said pleat and said transverse seals being such that said steam and vapor expands said pleat creating a three-surface, generally tubular structure with sealed transverse edges, each surface having one common edge with each of the other surfaces and each surface convexly curved between the sealed transverse edges and between its common edges such that only one of said surfaces of the package contacts said oven floor and makes minimal contact between the package and the microwave oven floor thereby reducing heat transfer from said package to said floor.

4,927,649
METHOD OF MAKING A HEMICELLULOSE COATED DIETARY FIBER

Robert N. Antenucci, Decatur, Ill., assignor to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Sep. 16, 1988, Ser. No. 245,890
Int. Cl.[5] A23P 1/08
U.S. Cl. 426—273 12 Claims

1. A method of preparing a soluble/insoluble dietary fiber supplement from corn bran comprising:

(a) removing from a first portion of corn bran at least a portion of a digestible component thereof to concentrate the dietary fiber content thereof and yield an insoluble fiber;

(b) extracting hemicellulose from a second portion of corn bran,

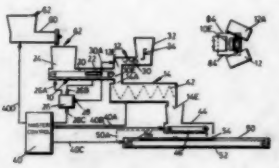
(c) coating the insoluble fiber with the hemicellulose using an aqueous medium, and

(d) removing said aqueous medium from said coating to deposit said hemicellulose upon said insoluble fiber.

4,927,650
FOOD PREPARATION

William W. Roberts, Port Dinorwic, Great Britain, assignor to Quick Cuisine Limited, Wales

Continuation of Ser. No. 819,816, Jan. 16, 1986, abandoned. This application Feb. 22, 1989, Ser. No. 314,290
Claims priority, application United Kingdom, Jan. 16, 1985, 8501105
Int. Cl.[5] A23B 7/04, 7/16
U.S. Cl. 426—295 4 Claims



1. A method of producing a food product for a food dish requiring a main ingredient and further ingredients at least for flavoring purposes, said method comprising the steps of:

preparing a main ingredient and further ingredients separately to states wherein the further ingredients are in a dry particulate condition and wherein the main ingredient and the further ingredients are admixable to form said food product which can be quickly and readily brought to a state ready for consumption;

chilling the prepared main ingredient to between −5° C. and +10° C. and dividing the chilled main ingredient; and

after said chilling has been completed, continuously and simultaneously:

supplying the chilled and divided main ingredient and the unchilled dry particulate further ingredients into a mixing chamber separately and at independently controllable rates;

admixing the chilled and divided main ingredient and the dry particulate further ingredients in the mixing chamber to form a combined product where the main ingredient is coated by the dry particulate further ingredients; and

removing the combined product from the mixing chamber.

4,927,651

METHOD OF PRESERVING FOOD

Hiroo Kumagai, and Akio Okamoto, both of Yokohama, Japan, assignors to Kabushiki Kaisha Nasu, Kanagawa, Japan

Filed Mar. 3, 1989, Ser. No. 318,532
Claims priority, application Japan, Oct. 7, 1988, 63-253412
Int. Cl.[5] A23L 3/26
U.S. Cl. 426—324 27 Claims

1. A method of preserving food, comprising the steps of: adding to the food an aqueous solution containing a plant extract of 0.1 to 1% by volume containing flavonoids; preparing a wrapping material from a thermoplastic to which a far infrared radiating ceramic is added;; wrapping the food with the wrapping material, which is capable of radiating far infrared rays and absorbing ethylene gas; and maintaining the wrapped food at a low temperature.

4,927,652

PROCESS FOR THE EXTRACTION OF LACTONES FROM LIPID MATERIAL

Petrus G. M. Haring, Vlaardingen, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed Dec. 13, 1988, Ser. No. 283,701
Claims priority, application European Pat. Off., Dec. 16, 1987, 87202559
Int. Cl.[5] A23D 5/00
U.S. Cl. 426—330.6 10 Claims

1. Process for the extraction of lactones from a lactone-containing lipid material, by contacting a medium, having a temperature near the critical temperature of said medium, and having a pressure near the critical pressure of said medium, with the lipid material, and subsequently removing the medium, wherein the medium, upon contacting, has a temperature T (in °C.), and pressure P (in bar), such that:

$$-25 \leq T^* \leq 18.5$$

$$-40 \leq P^* \leq 300$$

$$T^* \times P^* \leq 1900$$

where $T^* = T - T_c$, $P^* = P - P_c$, T_c is the critical temperature (in °C.), and P_c is the critical pressure (in bar) of said medium.

4,927,653

STERILIZED FOODSTUFF PREPARATION

Clive Manvell, East Hanney, England, assignor to CMB Packaging (UK) Limited, Worcester, United Kingdom

Continuation of Ser. No. 38,467, Apr. 14, 1987, abandoned, which is a continuation of Ser. No. 663,237, Oct. 22, 1984, abandoned. This application Jun. 13, 1989, Ser. No. 366,294
Claims priority, application United Kingdom, Oct. 27, 1983, 8328725
Int. Cl.[5] A23L 1/01, 3/00
U.S. Cl. 426—399 9 Claims

1. A process for sterilizing a solid food product having water as a constituent thereof, said process comprising the steps of:

introducing the solid food product into a reaction vessel;

introducing a pressurized gaseous medium into the reaction vessel so as to subject the solid food product to an applied pressure which is sufficient to elevate the boiling point of water to at least 110° C.;

heating a cooking oil or fat to a temperature which is at least equal to said elevated boiling point of water;

continuously supplying the heated oil or fat to the reaction vessel for a predetermined period of time so as to immerse the solid food product in the heated oil or fat with the solid food product subjected to said applied pressure;

said predetermined period of time being sufficient to partly vaporize water in the solid food product and heat the interior of the solid food product to no more than the elevated boiling temperature of water, and long enough to sterilize the solid food product, but not long enough to allow drying out of the solid food product;

at the end of said predetermined period of time, halting the supply of heated oil or fat and releasing the solid food product from said applied pressure;

removing the solid food product from the reaction vessel and separating the solid food product from the heated oil or fat under aseptic conditions; and

hermetically sealing the solid food product in a container while still under aseptic conditions.

4,927,654

WATER SOLUBLE BULKING AGENTS

Ronald E. Barnett, Brewster, N.Y.; Roxane Dikeman, Arlington Heights, Ill.; Shyh-Yuan Liao, Schaumburg, Ill.; John Gill, Mount Prospect, Ill., and David P. Pantaleone, Buffalo Grove, Ill., assignors to The Nutrasweet Company, Deerfield, Ill.

Continuation-in-part of Ser. No. 76,632, Jul. 23, 1987, abandoned, which is a continuation-in-part of Ser. No. 19,816, Feb. 27, 1987, abandoned. This application Jul. 15, 1988, Ser. No. 218,532
Int. Cl.[5] A23L 1/308
U.S. Cl. 426—548 17 Claims

1. A sweetener composition comprising:

(a) a high potency sweetener and

(b) a water soluble bulking agent selected from the group consisting of:

(i) a hemicellulose A

(ii) a hemicellulose B

(iii) a modified hemicellulose A

(iv) a modified hemicellulose B and

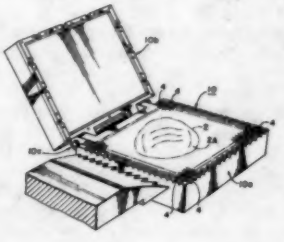
(v) mixtures of (i), (ii), (iii), and (iv).

4,927,655

HEAT PROCESSED FOOD BASE

Sadaharu Ito, 30-5, Saginomiya 1-chome, Nakano-ku, Tokyo 165, Japan

Filed Apr. 29, 1988, Ser. No. 188,548
Claims priority, application Japan, May 1, 1987, 62-108578
The portion of the term of this patent subsequent to May 22, 2006, has been disclaimed.
Int. Cl.[5] A21D 13/08
U.S. Cl. 426—549 3 Claims



1. A supply of intermediate products which can be individually toasted to provide crisp edible vessels, comprising:

a plurality of disk-like sheets of material partially baked from a batter mixture of the following ingredients:

Ingredient	Parts by Weight
wheat flour	80–120
sugar	30–60
oil or fat	10–30
egg	10–30

-continued

Ingredient	Parts by Weight
glycerin mono-fatty acid ester	0.5–2
powdered milk	3–5
salt	0.5
coloring and flavoring agents	small amount
water	80–120,

said sheets being at most slightly browned, having platen imprints on both opposite faces thereof, and having a moisture content of more than 7 percent to 20 percent by weight;

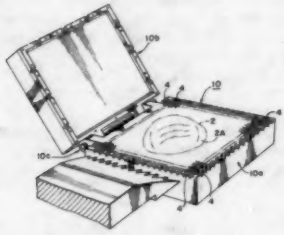
said sheets being stacked a plurality of sheets high, in a package containing at least ten such sheets.

4,927,656

METHOD OF PRODUCING EDIBLE VESSEL

Sadaharu Ito, 30-5, Saginomiya 1-chome, Nakano-ku, Tokyo 165, Japan

Filed Apr. 29, 1988, Ser. No. 188,550
Claims priority, application Japan, May 1, 1987, 62-108579
Int. Cl.[5] A21D *13/08*
U.S. Cl. 426—549 **7 Claims**



1. A method for providing a supply of intermediate products which subsequently can be toasted on-site to provide crisp edible vessels, comprising:

(a) providing a batter mixed from the following ingredients:

Ingredient	Parts by Weight
wheat flour	80–120
sugar	30–60
oil or fat	10–30
egg	10–30
glycerin mono-fatty acid ester	0.5–2
powdered milk	3–5
salt	0.5
coloring and flavoring agents	small amount
water	80–120

(b) inserting quanta of the batter between upper and lower platens heated to 120°–180° C. so that each quantum is contacted on opposite faces by respective upper and lower platens;

(c) while maintaining the batter at 110°–150° C. by heat transfer thereto from the platens partially baking the quanta of batter to produce disk-like intermediate products having a moisture content in the range of more than 7 percent to 20 percent by weight; and

(d) cooling, stacking and packaging into packages of at least ten, said intermediate products.

4,927,657

REDUCED TARTNESS SALAD DRESSING

James M. Antaki, San Leandro, and Daniel T. Layne, III, Clayton, both of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed Apr. 13, 1989, Ser. No. 338,367
Int. Cl.[5] A23L *1/24*
U.S. Cl. 426—589 **38 Claims**

1. An improved, reduced tartness salad dressing product which is resistant to bacteriological spoilage, including an edible oil in an amount of between about 0% and 90% by weight; moisture in an amount of between about 5% and 90% by weight; the balance being edible ingredients; and a preservation system comprising at least two edible acids in an amount sufficient to provide a titratable glacial acetic acid equivalent in said salad dressing product of between about 1.1% and about 6.5% by weight of the aqueous phase, and buffering salt sufficient to buffer said dressing product to a pH of from about 3.0 to about 4.5; wherein said edible acids are selected from phosphoric, acetic, fumaric, lactic, citric, adipic, malic, tartaric and hydrochloric, and

wherein the combination of said at least two acids and said pH contributes to low tartness in said salad dressing product.

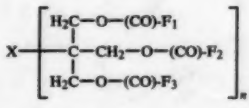
4,927,658

TRIS-HYDROXYMETHYL ALKANE ESTERS AS LOW CALORIE FAT MIMETICS

Lawrence P. Klemann, Somerville; John W. Finley, Whippany, and Anthony Scimone, Cedar Grove, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Feb. 16, 1989, Ser. No. 311,709
Int. Cl.[5] A23D *5/00*; C11C *3/00*
U.S. Cl. 426—611 **43 Claims**

1. A food composition comprising an edible fat compound of the formula



where

n=2,

X is an ester bridge having 1 to 8 carbons and

F_1, F_2, and F_3 are dicarboxylate-extended fatty acid residues.

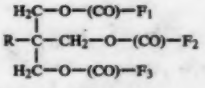
4,927,659

TRIS-HYDROXYMETHYL LOWER ALKANE ESTERS AS FAT MIMETICS

Lawrence P. Klemann, Somerville; John W. Finley, Whippany, and Anthony Scimone, Cedar Grove, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Feb. 16, 1989, Ser. No. 312,076
Int. Cl.[5] A23D *5/00*; C11C *3/00*
U.S. Cl. 426—611 **48 Claims**

1. A food composition comprising a partially digestible edible fat of the formula

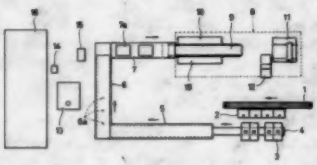


wherein R is a methyl or ethyl group, and F_1, F_2, and F_3 are the same or different fatty acid residues comprising from 10 to 22 carbon atoms.

4,927,660
MANUFACTURING PROCESS OF PACKED FAST-COOKING RICE

Joji Sano, No. 6-31, Rokkakubashi 6-chome, Kanagawa-ku, Yokohama-shi, Kanagawa-ken, Japan

Filed Nov. 10, 1988, Ser. No. 271,209
Claims priority, application Japan, Nov. 11, 1987, 62-283167
Int. Cl.[5] A23L *1/182*
U.S. Cl. 426—618 17 Claims



1. A process for preparing packaged fast-cooking rice, comprising washing raw material rice in water, soaking said washed rice in water, draining water from the rice, heating the rice to gelatinized grains of cooked rice having a water absorptive property, impregnating said gelatinized and water-absorptive grains of rice with an additive liquid to swell the grains of rice causing the grains of rice to separate from each other, and packaging the swelled and separated rice grains in an air evacuated package.

4,927,661
HEAT PRODUCT

Noel J. Bradshaw, Sharnbrook, and David Hughes, Rushden, both of United Kingdom, assignors to Unilever Patent Holdings, B.V., Rotterdam, Netherlands

Filed Aug. 19, 1985, Ser. No. 767,028
Claims priority, application United Kingdom, Aug. 17, 1984, 8420946
Int. Cl.[5] A23L *1/314, 1/315, 1/317*
U.S. Cl. 426—641 15 Claims

1. A two-phase meat product, comprising (a) from 20 to 90 percent by weight of a texture imparting phase, consisting of aligned, flat meat slices having a thickness of from 0.5 mm to 6 mm, and (b) from 80 to 10 percent by weight of a finely dispersed succulence imparting phase, comprising fat, water and a binding agent, said two-phase meat product exhibiting a parallel arrangement of its constituent phases.

7. A process of preparing a two-phase beef, pork or poultry meat product, according to claim 1, comprising the steps of:

(a) slicing beef, pork or poultry into slices having a thickness of from 0.5 mm to 6 mm, forming a texture imparting phase;

(b) forming a finely dispersed succulence imparting phase, comprising fat, water and a binding agent;

(c) gently combining the texture imparting phase and the succulence imparting phase;

(d) subjecting the mixture obtained to an alignment treatment, and

(e) bringing the aligned mixture into the required form and shape for consumption.

4,927,662
TREATMENT OF POWDERED CELLULOSE

Jau Y. Hsu, Brookfield, and Gary J. Larson, New Milford, both of Conn., assignors to Nestec S.A., Vevey, Switzerland

Continuation of Ser. No. 857,109, Apr. 29, 1986, abandoned, which is a continuation of Ser. No. 528,562, Sep. 1, 1983, abandoned, which is a continuation of Ser. No. 313,906, Oct. 22, 1981, abandoned, which is a continuation of Ser. No. 170,089, Jul. 18, 1980, abandoned. This application Jun. 28, 1988, Ser. No. 214,910
Int. Cl.[5] A23L *1/10, 1/015*
U.S. Cl. 426—658 13 Claims

1. A process for treating powdered cellulose which comprises combining powdered cellulose, a flavoring agent and water, wherein, by weight, the wate is in an amount of from 25 to 75 parts per 100 parts of powdered cellulose, and mixing the cellulose, flavoring agent and water to provide a mixture in which substantially all of the cellulose is wetted and then heating the mixture to remove most of the water.

4,927,663
METHOD FOR MINIMIZING CURLING IN SCREEN PRINTING

Richard F. Small, Gillingham; Dakshesh S. Patel, Harrow, both of United Kingdom; Lascelle A. Barrow, London, and Barry M. Dix, Middlesex, both of England, assignors to Small Products Limited, London, England

PCT No. PCT/GB87/00541, § 371 Date Sep. 30, 1988, § 102(e) Date Sep. 30, 1988, PCT Pub. No. WO88/00889, PCT Pub. Date Feb. 11, 1988
PCT Filed Jul. 30, 1987, Ser. No. 254,800
Claims priority, application United Kingdom, Jul. 30, 1986, 8618595; Aug. 6, 1986, 8619245
Int. Cl.[5] B05D *3/06, 1/32, 3/02, 5/00*
U.S. Cl. 427—40 29 Claims

1. A method for minimizing substrate edge-curl in a process when a substrate is screen printed with a water-based screen printing ink comprising the steps of:

(a) carrying out a first screen printing using an ink which produces a minimal curl in the substrate edge; and then

(b) carrying out at least one subsequent screen printing on the printed substrate from step (a) using a water-based ink —,whereby any resulting curl is less than that which would be obtained if the first screen printing were with said water-based ink—.

4,927,664
PROCESS FOR APPLYING ELECTRICALLY INSULATIVE LAYERS

Chong S. Tsai; Shou H. Chen; Bean T. Li, and King L. Jean, all of Hsinchu, Taiwan, assignors to Industrial Technology Research Institute, Taiwan

Filed Mar. 15, 1989, Ser. No. 324,212
Int. Cl.[5] B05D *3/12*
U.S. Cl. 427—57 3 Claims

1. A process for applying an electrically insulative layer on a metal surface which comprises suspending an electrically insulative powder in a highly volatile solvent by ultrasonic vibration to give a homogeneous suspension, applying said suspension on the surface of said metal surface, and then evaporating said solvent, leaving an electrically insulative layer consisting essentially of said insulative powder.

4,927,665

SIMULTANEOUS MULTI-LAYER COATING METHOD FOR MANUFACTURING MAGNETIC RECORDING MEDIUM

Naoyoshi Chino; Tsunehiko Sato; Shinji Saito, and Hiroshi Ogawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 12, 1989, Ser. No. 420,410
Claims priority, application Japan, Oct. 13, 1988, 62-255967
Int. Cl.[5] H01F *10/02*
U.S. Cl. 427—131 7 Claims

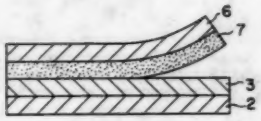
1. In a coating method in which a plurality of organic-solvent-based layers are simultaneously formed on a nonmagnetic support which is continuously run to manufacture a magnetic recording medium, the improvement wherein a surface tension of a solvent composition comprising at least two types of solvents and which is used to form an uppermost one of said plurality of layers is lower than a surface tension of a solvent composition comprising at least two types of solvents and which is used to form the remaining layers, said surface tension of said solvent composition forming said uppermost of said plurality of layers being in a range of 0.1 to 10 dyne/cm.

4,927,666

IMAGE-RECEIVING SHEET

Sadanobu Kawasaki, Tokorozawa; Mineo Yamauchi, Ichikawa, and Masanori Akada, Tokyo, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

Division of Ser. No. 871,918, Jun. 9, 1986, Pat. No. 4,820,687, which is a continuation of Ser. No. 633,252, Jul. 23, 1984, Pat. No. 4,626,256. This application Dec. 13, 1988, Ser. No. 283,973
Claims priority, application Japan, Jul. 25, 1983, 58-135627
Int. Cl.[5] B41M *3/12, 5/035, 5/26*
U.S. Cl. 427—146 19 Claims



1. A process for producing an image-receiving sheet for use in an image-forming system wherein said sheet is brought into contact with a heat transfer sheet, said heat transfer sheet comprising a support and a heat transfer layer provided on the support comprising a heat transferable dye contained in a synthetic resin binder, wherein an image is formed on the image-receiving sheet by contacting the heat transfer layer with the image-receiving sheet and selectively heating at least a portion of the heat transfer sheet with heating means to transfer the dye selectively from the heat transfer layer to the image-receiving sheet, the process comprising:

preparing a substrate;

applying a composition for forming an image-receiving layer onto the substrate, the composition comprising:

(a) a synthetic resin for receiving the dye transferred from the heat transfer layer of the heat transfer sheet;

(b) a dye-permeable releasing agent for preventing heat adhesion of the synthetic resin binder of the heat transfer sheet to said image-receiving layer upon heating thereof by the heating means; and

(c) a solvent;

pre-drying the composition thus applied in a dryer, such that the solvent is thoroughly removed from the applied composition; and

drying the composition such that at least a portion of said releasing agent is exuded to form a releasing agent layer on at least a portion of a surface of the image-receiving layer.

4,927,667

AQUEOUS PROCESS FOR PREPARING WATER-RESISTANT COATINGS OF HYDROPHOBIC COPOLYMERS MADE FROM HYDROPHILIC MONOMERS

Jenn S. Shih, Paramus; Terry E. Smith, Morristown, and Robert B. Login, Oakland, all of N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed Jun. 22, 1989, Ser. No. 370,208
Int. Cl.[5] B65B *33/04*
U.S. Cl. 427—154 6 Claims

1. An aqueous process for preparing water-resistant coatings of hydrophobic copolymers made from hydrophilic monomers which comprises:

(a) providing a hydrophobic copolymer including (i) about 15–85% by wt. of a hydrophilic vinyl lactam and (ii) about 85–15% by wt. of a hydrophilic polymerizable carboxylic acid which copolymer is water-resistant within said ranges,

(b) forming an aqueous solution of said hydrophobic copolymer in a volatile neutralizing agent,

(c) applying said solution to a substrate to form a coating of said copolymer thereon, and

(d) removing said volatile neutralizing agent from said coating to convert it into a water-resistant coating.

6. A process according to claim 1 wherein step (d) is carried out with heating.

4,927,668

TREATMENT FOR AUTOMOBILE WINDSHIELDS

Patrick D. Senckowski, 114 Southbridge St., Worcester, Mass. 01608, assignor to Joseph M. Senckowski and Patrick D. Senckowski, both of Worcester, Mass.

Filed Aug. 1, 1988, Ser. No. 226,617
Int. Cl.[5] B05D *5/06*
U.S. Cl. 427—168 4 Claims

1. The process of applying onto at least one surface of an optically clear substrate a compound which forms a transparent anti-fogging and anti-wetting layer from a valve actuated, pressurized container comprising the following steps:

(a) actuating the valve,

(b) directing the compound onto the surface of an optically clear substrate, and wherein said compound comprises:

(1) 10 to 20% by weight of an isoparaffinic hydrocarbon solvent,

(2) 10 to 20% by weight of an alkane selected from the group consisting of isobutane, N butane, and propane,

(3) 5 to 15% by weight of a hydrocarbon wax, and

(4) 60 to 70% by weight of water, and

(c) buffing the substrate with a terry-type cloth to remove dirt and oils from the substrate and to provide a uniform and transparent layer of the compound on said surface.

4,927,669

OIL FIELD CORROSION INHIBITION

David E. Knox, Goose Creek, and Eugene R. Fischer, James Island, both of S.C., assignors to Westvaco Corporation, New York, N.Y.

Filed Jul. 15, 1988, Ser. No. 219,184
Int. Cl.[5] B05D *7/22*
U.S. Cl. 427—239 9 Claims

1. A method for inhibiting corrosion in downwell oil field equipment and piping which is in contact with an oil/water medium taken from a producing well by coating said equipment and piping with a formulation including a reaction product of C_{18} unsaturated fatty acids and a compound selected from the group consisting of maleic anhydride and fumaric acid, wherein said product is selected from the group consisting of a fatty acid Diels-Alder adduct and a fatty acid-ene reaction product, wherein the formulation is added to said oil/water medium.

4,927,670

CHEMICAL VAPOR DEPOSITION OF MIXED METAL OXIDE COATINGS

Ahmet Erbil, Atlanta, Ga., assignor to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Jun. 22, 1988, Ser. No. 210,023
Int. Cl.[5] C23C 16/00; B05D 5/12
U.S. Cl. 427—255.3 **11 Claims**

1. A chemical vapor deposition process for preparing a composite article comprising a thin mixed metal oxide film coating on a substrate, which comprises: contacting a heated substrate with (1) an oxidizing gas stream and (2) heat decomposable organometallic compounds yielding on decomposition two or more metals of different groups of the Periodic Table and each selected from the group consisting of metals of Group IIA and transition metals of the Periodic Table, said heat decomposable organometallic compounds being contained in one or more nonoxidizing carrier gas streams, said heat decomposable organometallic compounds including at least one compound of the following formula (I)

(I)

wherein:

M_1 is a metal of Group IIA, IIIB, IVB, VB, VIB, VIIB or VIII of the Periodic Table,

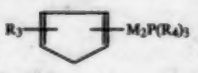
R_1 is a lower alkyl or lower alkenyl radical of 2 to about 6 carbon atoms,

R_2 is hydrogen, fluoring, a lower alkyl radical of 1 to 6 carbon atoms, or a lower alkenyl radical of 2 to 6 carbon atoms,

n is the valence of M_1 and is an integer from 2 to 4, and

p is an integer from 0 to (n−1);

or a compound of the following formula (II)



(II)

wherein;

M_2 is a metal of Group IB of the Periodic Table;

R_3 is a lower alkyl radical of 1 to about 6 carbon atoms, or a lower alkenyl radical of 2 to about 6 carbon atoms; and

R_4 is a lower alkyl radical of 1 to 6 carbon atoms;

the temperature of said substrate being from 150° C. and above the decomposition temperatures of said organometallic compounds.

4,927,671

METHOD OF PRODUCING COLORED DECORATIONS ON CERAMIC PRODUCTS

Klaus Nawotinig, Brachttal, Fed. Rep. of Germany, assignor to Wachtersbacher Keramik Otto Friedrich Furst zu Ysenburg und Budingen GmbH & Co. KG, Brachttal, Fed. Rep. of Germany

Filed Feb. 18, 1988, Ser. No. 157,378
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1987, 3705572
Int. Cl.[5] B05D 3/02, 5/00
U.S. Cl. 427—274 **7 Claims**

1. Process for the production of colored decorations on ceramic bodies comprising

forming an aqueous suspension of a pigment, said aqueous suspension containing at least one surface active agent,

causing said aqueous suspension to foam,

contacting said ceramic body with said foam and thereby depositing said pigment on said ceramic body, and

heating said ceramic body to a temperature of about 600° to 1500° C.

4,927,672

PROCESS FOR RAPIDLY FIXING WOOD PRESERVATIVES TO PREVENT AND REDUCE ENVIRONMENTAL CONTAMINATION

William F. Drinkard, Jr., Charlotte, N.C., assignor to Drinkard Developments, Charlotte, N.C.

Filed May 11, 1989, Ser. No. 350,604
Int. Cl.[5] B05D 1/18
U.S. Cl. 427—336 **33 Claims**

1. A process for accelerated fixing of heat-fixable wood preservatives in wood, comprising:

contacting preservative-impregnated wood with an aqueous heated liquid heating medium preheated to at least 100 degrees F.;

raising the temperature of the wood from ambient to from 100 F. to 240 degrees F.; and

maintaining both liquid contact and raised temperature of the wood for a period of time from 20 minutes up to 2 hours;

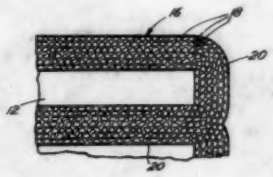
whereby complete fixation occurs in less than 48 hours.

4,927,673

RAPID TECHNIQUE FOR MAKING IMPROVED LAMINAR CERAMIC SHELL MOLDS USING A PHOSPHATE MODIFIED ALUMINUM SALT BINDER

Kermit A. Buntrock, Chicago, Ill.; Daniel R. English, Felton, Calif., and Wescomb R. Jones, Wilmington, Del., assignors to Buntrock Industries, Inc., Lively, Va.

Filed Jan. 27, 1988, Ser. No. 148,940
Int. Cl.[5] B05D 3/02
U.S. Cl. 427—376.2 **39 Claims**



1. An investment casting process for forming a laminar ceramic mold, comprising in combination the steps of:

(a) preparing a first bath comprising either an alkali stabilized solution of negatively charged ionic silicate or an alkali stabilized sol of negatively charged colloidal silica;

(b) preparing a second bath comprising an acid stabilized solution of phosphate modified positively charged aluminum salt;

(c) dipping a support structure initially into one of the baths to define a first coating on the support structure; and

(d) dipping the support structure thereafter into the other of the baths to define a second coating on the support structure;

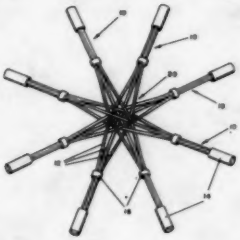
whereby the first and second coatings on the support structure react to form a gel set shell which can thereafter be fired to create a ceramic.

4,927,674

WOVEN WIRE APPARATUS

Bradford L. Smith, Santa Fe, N. Mex., assignor to Wovenwire Corporation, Santa Fe, N. Mex.

Filed Mar. 2, 1989, Ser. No. 319,633
Int. Cl.[5] A45B *19/00, 27/00*
U.S. Cl. 428—11 39 Claims



1. A woven wire apparatus comprising at least one bundle, said bundle comprising:

a plurality of multi-wire elements, each said multi-wire element having first and second ends, and each said multi-wire element comprising a plurality of stiff but slightly flexible wires;

means for positioning said multi-wire elements in a mutually intersecting relationship to one another;

means for joining said first end and means for joining said second end of said multi-wire elements whereby said elements are thereby retained in said intersecting relationship to one another; and

movably engageable wire retaining means additional to said positioning means and said joining means for fixing said elements in position and allowing movement of said elements.

4,927,675

FILLED CORE MATERIALS HAVING UNFILLED OUTER ATTACHED LAYERS

Ronald L. Adams, Mt. Vernon; Kirk L. Kimbel, Evansville, and Clayton B. Quinn, Mt. Vernon, all of Ind., assignors to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 814,960, Dec. 31, 1985, abandoned. This application Apr. 21, 1989, Ser. No. 342,606
Int. Cl.[5] B32B *27/08, 27/36;* B27N *5/00*
U.S. Cl. 428—35.9 12 Claims

1. A coextruded multilayer material comprising an aromatic polycarbonate core layer having a substantial amount of at least one colorant dispersed therein, said colorant being present at a level of from one percent by weight to 40 percent by weight of the total weight of said multilayer material;

a transparent first coextruded aromatic polycarbonate outer layer attached to a first surface of the core layer and substantially free of dispersed colorants; and

a transparent second coextruded aromatic polycarbonate outer layer attached to a second surface of the core layer opposite the first surface and substantially free of dispersed colorants, said first and second outer layers each having a thickness sufficient to prevent the migration of the colorant dispersed in said core layer to the surface portions of said first and second outer layers opposite the core layer, said first and second outer layers each having a thickness of from 0.5 mil to about 30 mils.

4,927,676

METHOD FOR RAPID ADHERENCE OF ENDOTHELIAL CELLS ONTO A SURFACE AND SURFACES PREPARED THEREBY

Joel L. Williams; David B. Montgomery, both of Cary, and Lillian P. Baldwin, Durham, all of N.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation of Ser. No. 214,240, Jul. 1, 1988, abandoned. This application Apr. 19, 1989, Ser. No. 340,190
Int. Cl.[5] A01N *1/02*
U.S. Cl. 428—36 21 Claims

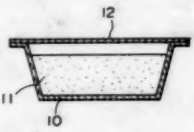
1. A method for endothelialization of a polymeric surface comprising contacting a polymeric surface with a plasma generated from a gaseous material comprising nitrogen whereby said polymeric surface is modified to contain surface amino groups, and applying to said modified surface sufficient endothelial cells to form a confluent layer of cells on said amino group-containing surface without a requirement for cell proliferation.

4,927,677

COMPOSITE MATERIALS AND TOP MATERIALS FOR RETORT CONTAINER

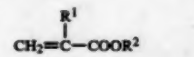
Ryusuke Kasai, Kiyose, Japan, assignor to Nikka Co., Ltd., Kanagawa, Japan

Filed Apr. 28, 1988, Ser. No. 187,297
Claims priority, application Japan, Apr. 28, 1987, 62-105521; Apr. 28, 1987, 62-105522
Int. Cl.[5] B32B *27/00;* B65D *5/00*
U.S. Cl. 428—36.6 20 Claims



1. A composite material for a retort container which comprises:

a biaxially stretched film consisting essentially of a copolymer of vinylidene chloride and an acrylic ester shown by the following formula (1):



$$CH_2=C(R^1)-COOR^2 \quad (1)$$

wherein R^1 represents hydrogen or a methyl group and R^2 represents a substituted or unsubstituted monovalent hydrocarbon group having 1 to 20 carbon atoms, and

a first polypropylene film superposed on one or both sides of the biaxially stretched film.

4,927,678

PROTECTIVE BELLOWS PARTICULARLY FOR A MOTOR VEHICLE FRONT WHEEL DRIVE

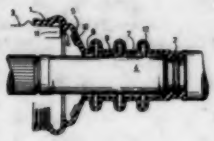
Serge Lallement, La Chapelle S/erdre, France, assignor to Compagnie Des Products Industriels de l'Ouest (C.P.I.O.), Carquefou, France

Filed Dec. 1, 1988, Ser. No. 278,470
Claims priority, application France, Dec. 1, 1987, 87 16631
Int. Cl.[5] F16D *3/84*
U.S. Cl. 428—36.9 6 Claims

1. A protective bellows made of polymer material for a motor vehicle front wheel drive having a transmission with a bowl and a drive shaft, which comprises:

a conical part to be fastened to said bowl of said transmission; and

a cylindrical part having a substantially uniform diameter connected with said conical part wherein said cylindrical



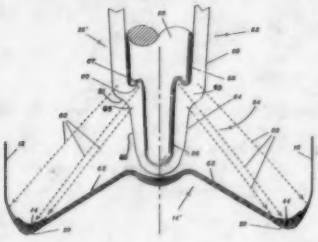
part includes a plurality of folds positioned along the length of said cylinder.

4,927,679

PREFORM FOR A MONOBASE CONTAINER

Martin H. Beck, Merrimack, N.H., assignor to Devtech, Inc., Amherst, N.H.

Continuation-in-part of Ser. No. 129,642, Dec. 7, 1987, Pat. No. 4,889,752, which is a continuation-in-part of Ser. No. 55,647, May 29, 1987, Pat. No. 4,780,257. This application Oct. 21, 1988, Ser. No. 261,551
Int. Cl.[5] B65D *23/00*
U.S. Cl. 428—36.92 21 Claims



1. An improved preform for use in a blow molding process for producing a one-piece plastic container by expanding a hollow preform containing material for a neck, sidewall and base of the container in a mold; the preform having an open neck to form the neck, a sidewall-forming portion of constant thickness and a baseforming portion including an annular thickened portion positioned such that following blowing of the preform the material of the base-form portion is deposited so that an inward sloping base portion is formed which is of a thickness sufficient to resist self-deformation and create a moment arm thereof around a chime tending to unroll and radially stretch the chime, the chime having an integral reinforcing hoop formed therein to prevent unrolling and radial stretching of the chime which would allow inversion of the inward sloping base portion, the preform defining interior and exterior walls which are ever decreasing in diameter from the neck to the base so that the preform may be easily removed from a mating core and injection mold cavity used to mold the preform thereby avoiding the need for a split mold to form the preform, and the base forming portion having an exterior annular concavity adjacent the thickened portion remote from the sidewall-forming portion.

4,927,680

PREFORM AND METHOD OF FORMING CONTAINER THEREFROM

Wayne N. Collette, Merrimack; Suppayan M. Krishnakumar, Nashua, and David P. Piccioli, Auburn, all of N.H., assignors to Continental PET Technologies, Inc., Norwalk, Conn.

Division of Ser. No. 137,565, Dec. 24, 1987, Pat. No. 4,863,046. This application Apr. 11, 1989, Ser. No. 336,417
Int. Cl.[5] B65D *25/00*; B29C *49/08*
U.S. Cl. 428—36.92 14 Claims

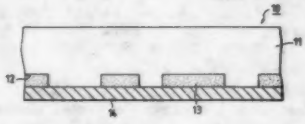
1. A preform for forming a blow molded hot fill container, said preform being formed of a polyester resin and including a base portion, a body portion, a neck finish portion and a neck to body transition, said neck finish portion including a lower flange immediately adjacent said neck to body transition, said neck to body transition has a portion of minimum cross section in its entirety spaced from said flange, said minimum cross section portion being of a lesser thickness than said body portion, and said neck to body transition flaring in thickness to said body portion.

4,927,681

OPTICAL INFORMATION RECORDING MEDIUM PROVIDING REFLECTED LIGHT AT TWO DIFFERENT WAVELENGTHS

Kiyofumi Chikuma, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 327,884
Claims priority, application Japan, Aug. 12, 1988, 63-202542
Int. Cl.[5] B32B *3/02*
U.S. Cl. 428—64 13 Claims



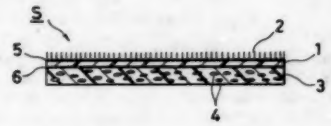
1. An optical information recording medium comprising:
transparent substrate means;
reflective layer means provided on a first principal surface of said substrate means; and
island means of light-emitting material formed between said substrate means and said reflective layer means, said island means being sensitive to illuminating light incident thereupon, and in response thereto, for producing emitting light having a different wavelength than said illuminating light,
said recording medium being adapted such that a recording information surface corresponds to an array of said island means of light-emitting material.

4,927,682

HEAT-RESISTANT FLOCK SHEET

Satoru Nagura, Tokyo; Tsutomu Ebihara, and Toshihide Matsumoto, both of Tsuchiura, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Jun. 8, 1989, Ser. No. 364,353
Claims priority, application Japan, Jun. 14, 1988, 63-77799[U]
Int. Cl.[5] B32B 33/00
U.S. Cl. 428—88 14 Claims



1. A heat-resistant flock sheet comprising a heat-resistant film layer consisting of an unfusible organic polymer, a flock layer formed by flocking a plurality of short fibers on a surface of said heat-resistant film and a first adhesive layer positioned between the heat-resistant film and the flock layer; a drawn film layer containing a plurality of voids laminated on a surface of said heat-resistant film layer opposite to said flock layer and a second adhesive layer positioned between the heat-resistant film layer and the drawn film layer; said drawn film layer comprising a synthetic polymer having particulate fillers, and being drawn to form voids around the particulate fillers.

4,927,683

COLOR-BEARING TEXTILE PRODUCT

Masatoshi Tsutsui, Aichi, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Nov. 19, 1987, Ser. No. 122,437
Claims priority, application Japan, Dec. 13, 1986, 61-297240
Int. Cl.[5] B32B 7/00, 15/00
U.S. Cl. 428—90 7 Claims

1. A color-bearing textile product which comprises fibers, silver-gray metal layer formed on the surface of said fibers, said silver-gray metal layer covering the surface of said fibers, and a thin chromatic color layer having such a thickness as permits light to pass therethrough, said color-bearing textile product having a metallic color inherent in said thin chromatic color layer.

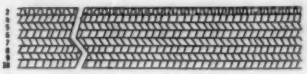
4,927,684

ASSEMBLY OF SEVERAL LAYERS HAVING ONE OR MORE REINFORCING LAYERS AND FIBER REINFORCED PLASTIC ARTICLE PRODUCED THEREFROM

Javier Asensio, Tägerwilen, and Richard Hayman, Frauenfeld, both of Switzerland, assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 26, 1988, Ser. No. 186,324
Claims priority, application Switzerland, Apr. 28, 1987, 611/87
Int. Cl.[5] B32B 33/00
U.S. Cl. 428—91 15 Claims

1. An assembly of several resin-impregnated layers having
(a) one or more reinforcing layers produced of unidirectional, bidirectional, multidirectional or random fibers or combinations thereof produced of glass, boron or carbon fibers, aromatic polyamide fibers, silicon carbide fibers or mixtures thereof, and
(b) one or two knitted or woven textile fabrics (2, 12) having at least one tufted, fibrous, velvety, napped, brushed or pile surface,



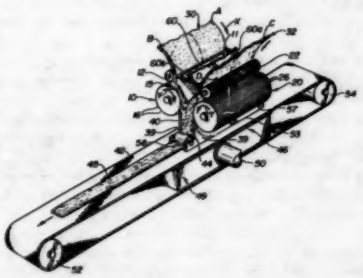
the textile fabric(s) (2, 12) being the external layer(s) of the assembly and the tufted, fibrous, velvety, napped, brushed or pile surface of the textile fabric(s) forming the surface(s) of the assembly.

4,927,685

TRANSVERSE WEBBER AND STRATIFIED WEBS FORMED THEREWITH

Gerald M. Marshall, Somerville; Raymond Hall, Jr., Hampton, and Allan P. Farrington, Englishtown, all of N.J., assignors to Chicopee, New Brunswick, N.J.

Filed Sep. 22, 1987, Ser. No. 99,875
Int. Cl.[5] B32B 5/08, 5/12, 5/26; D04H 1/70
U.S. Cl. 428—74 10 Claims



1. A nonwoven fiber structure having at least one layer with a preponderance of a first fiber material toward one lateral edge, a predponderance of a second fiber material different from said first fiber material toward the other lateral edge, a first transition zone of fibers in between, further including a second layer over said one layer having a preponderance of a third fiber material toward said one lateral edge, a fourth fiber material different from said third fiber material toward the other lateral edge, a second transition zone of fibers in between said preponderance of third and fourth fibers and a third transition zone between said first and second layers.

4,927,686

COLBAR ART

Ovidiu Colea, Glen Cover, N.Y., assignor to Colbar Art, Inc., Long Island City, N.Y.

Continuation-in-part of Ser. No. 152,161, Feb. 4, 1988, abandoned. This application Dec. 20, 1988, Ser. No. 288,033
Int. Cl.[5] B44C 3/06
U.S. Cl. 428—13 17 Claims

1. An ornamental article comprising an inner shaped body embedded within an outer shaped body, said inner and outer body being formed of a base material moldable into a unitary, integrally formed transparent mass with amorphous interfaces, at least the base material of said inner body having homogenously suspended in said material, a minute amount of finely

ground nonsoluble matter sufficient only to render said base material at least in part translucent and to provide the article

with three-dimensional regions visible when viewed through the outer body.

4,927,687

SUSTAINED RELEASE TRANSDERMAL DRUG DELIVERY COMPOSITION

Elie S. Nuwayser, Wellesley, Mass., assignor to Biotek, Inc., Woburn, Mass.

Division of Ser. No. 653,362, Oct. 1, 1984, Pat. No. 4,624,665. This application Sep. 22, 1986, Ser. No. 909,959

Int. Cl.[5] A61L *15/03*

U.S. Cl. 424—449 17 Claims

1. A composition for the accelerated sustained release, transdermal delivery of a drug to a user, which composition comprises:

(a) a viscous, film-forming base material selected to match generally the degree of hydrophobicity of the drug and, when placed in contact with the skin of the user, to occlude the skin of the user and to force hydration of the stratum corneum layer by diffusion of water from the lower layers of the epidermis of the user in use and to increase the porosity of the stratum corneum layer and thereby to accelerate the transdermal drug delivery across said layer; and

(b) a plurality of drug rate controlling solid microparticles generally uniformly dispersed and suspended in the base material, the microparticles having a particle size of less than about 1000 microns and containing an effective therapeutic amount of a drug for transdermal delivery, the active drug of transdermal delivery and the base material selected to permit the transport of the drug from the rate controlling microparticles and through the base material and into the skin of the user; whereby, on application to the skin of the user of the transdermal drug composition, the drug is released at a sustained release rate from the suspended microparticles into the base material and into the skin of the user.

4,927,688

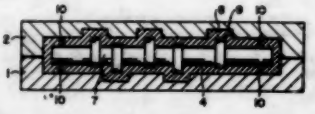
CAST-IRON ELEMENT

Rudi Haas, Monchen-Gladbach; Georg Jansen, Eschweiler, and Wilhelm Kallen, Monchen-Gladbach, all of Fed. Rep. of Germany, assignors to Eisengiesserei Monforts GmbH & Co., Monchen-Gladbach, Fed. Rep. of Germany

Division of Ser. No. 132,983, Dec. 15, 1987, Pat. No. 4,832,107. This application Jan. 27, 1989, Ser. No. 303,532

Int. Cl.[5] B32B *1/08, 17/06, 15/04*

U.S. Cl. 428—34.6 3 Claims



1. A cast-iron element having an entirely enclosed interior area occupied by a core of glass conforming to said interior area.

4,927,689

GAS BARRIER STRUCTURES

Stan J. Markiewicz, Whitby, Canada, assignor to Du pont Canada Inc., Mississauga, Canada

Filed Jul. 7, 1987, Ser. No. 70,829

Claims priority, application United Kingdom, Jul. 17, 1986, 8617535

Int. Cl.[5] A22C *13/00*

U.S. Cl. 428—34.8 11 Claims

1. A composite structure comprising a base synthetic thermoplastic polymeric layer having two coatings on one side of the base layer, the first coating being adjacent the base layer and being a solvent-based urethane primer, which when dry allows an aqueous dispersion or solution of polyvinyl alcohol to "wet out" the primer, in an amount in the range of from 0.3 to 3.0 g/m^2 of the base layer, and the second coating being placed on the exposed surface of the first coating and comprising a polyvinyl alcohol gas barrier material in an amount in the range up to about 2.0 g/m^2 of said base layer, said second coating having been formed from a dispersion or solution.

4,927,690

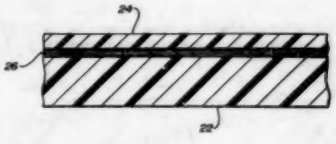
THERMOPORMABLE LAMINATED PACKAGING MATERIAL

Gary C. Welsh, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 818,439, Jan. 13, 1986, abandoned. This application Nov. 28, 1988, Ser. No. 277,079

Int. Cl.[5] B65D *25/00;* B32B *27/28*

U.S. Cl. 428—35.7 4 Claims



1. A rigid, thermoformable packaging material for medical, dental, and food packages comprising of an outer layer consisting essentially of a nonfoamed biaxially oriented polystyrene having a thickness of between about 1 to about 30 mils, and an inner layer laminated to said outer layer of a polymer resin selected from the group consisting of low density polyethylene, high density polyethylene, polypropylene and nylon, said inner layer having a thickness of between about 0.5 to about 10 mils, and wherein said oriented polystyrene comprises from about 78% to about 96.5% by weight of said packaging material.

4,927,691

IMPLOSION RESISTANT FILMS

Solomon Bekele, Taylors, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Oct. 16, 1987, Ser. No. 109,543

Int. Cl.[5] B32B *27/08*

U.S. Cl. 428—35.2 8 Claims

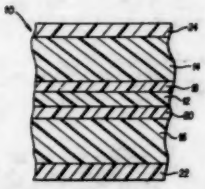
1. An implosion resistant film comprising:

(a) a core layer of ethylene vinyl acetate copolymer;

(b) two intermediate layers each comprising ethylene vinyl acetate copolymer;

(c) two polymeric layers of low density polyethylene which each bond an intermediate layer to a respective surface of the core layer;

(d) a first outer layer bonded to one of the intermediate layers, comprising a heat sealable polymeric material; and



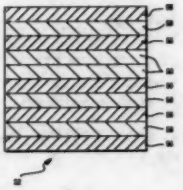
(e) a second outer layer, bonded to one of the intermediate layers, comprising a high density polyethylene.

4,927,692

ANTISTATIC MASK FOR USE WITH ELECTRONIC TEST APPARATUS

Padmanabhan Dhanakoti, Austin; Gerry W. Moore, Valley Mills, and Harold F. Smith, Cedar Park, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 25, 1988, Ser. No. 275,890
Int. Cl.[5] B32B *3/00*
U.S. Cl. 428—137 **20 Claims**



1. An antistatic mask for use with a bed-of-nails type electronic card tester having a plurality of pin probes and electronic switches associated therewith comprising

a plurality of first layers of a hygroscopic material;

a plurality of second layers of insulative support material, each of said second layers being disposed between a different pair of said first layers; and

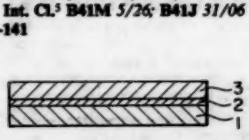
a plurality of aperture means defined by and extending through said first and second layers and substantially normal to a plane defined by said first and second layers for receiving said pin probes.

4,927,693

THERMAL TRANSFER RECORDING MEDIUM AND ITS MANUFACTURING METHOD

Kunihiro Koshizuka; Toshiaki Tezuka; Takao Abe, and Haruo Ebisawa, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jan. 23, 1989, Ser. No. 300,614
Claims priority, application Japan, Jan. 26, 1988, 63-16357; Jan. 26, 1988, 63-16359; Feb. 24, 1988, 63-42474
Int. Cl.[5] B41M *5/26*; B41J *31/06*
U.S. Cl. 428—141 **10 Claims**



1. A thermal transfer recording medium comprising

a support, and

coated on said support, an anchor layer which is operable to remain substantially on said support and not be transferred when the thermal transfer recording medium is used, and

coated on said anchor layer, a thermally fusible colorant layer,

wherein said anchor layer contains a resin component and not less than 25% by weight of carbon black, and said colorant layer contains carbon black.

4,927,694

METHOD OF PRODUCING SKIN-COVERED PAD FOR SEAT

Ichiro Matsuura, and Toyoharu Chiyoshi, both of Ayase, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed May 26, 1988, Ser. No. 200,633
Int. Cl.[5] B32B *1/04, 3/02, 3/26*
U.S. Cl. 428—159 **5 Claims**

1. A skin-covered pad for a seat, comprising:

a base structure of foamed plastic; and

an outer skin member which covers said base structure, wherein said outer skin member includes:

an innermost foamed layer having an inner surface intimately contacting said base structure, and having first wettable and second nonwettable parts, said first and second parts being wettable and non-wettable with respect to a liquid material used to produce said base structure;

an outermost layer covering said innermost foamed layer, and

a non-wettable backing sheet interposed between said outermost and innermost layers,

wherein said second part of said innermost foamed layer is expanded outward thereby to provide the outer surface of said outer skin member with a raised portion.

2. A skin-covered pad as claimed in claim 1, in which said outer skin member has an outward projection at the position where said second part is located.

4,927,695

MICROPOROUS MARKING STRUCTURES

Willem Ooms; Frank R. Moss, both of Cookeville, and Jonnie L. Key, Algood, all of Tenn., assignors to Porelon, Inc., Cookeville, Tenn.

Continuation of Ser. No. 34,124, Apr. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 775,456, Sep. 11, 1985, abandoned. This application Jun. 6, 1989, Ser. No. 363,347
Int. Cl.[5] B41K *1/38*
U.S. Cl. 428—159 **29 Claims**

7. A marking structure, comprising:

a microporous layer having front and rear faces and formed from interconnected particles of a thermoplastic resin impregnated with an ink, said microporous layer having a relief pattern on a front fact thereof for transferring an ink image of said relief pattern to a surface to be marked, said particles forming an open-celled network of pores allow-

ing repetitive tranafer of an ink image of said relief pattern to the marking surface; and

an absorbent backing layer having front and rear faces, said front face of said backing layer being superposed on said rear face of said ink impregnated layer, said backing layer containing excess ink absorbed from said ink impregnated layer in an amount in the range of about 0.3 to 0.7 grams of ink per per square inch of said backing layer, and said backing layer is bonded to said microporous layer at an interface zone wherein said resin permeates said backing layer.

4,927,696

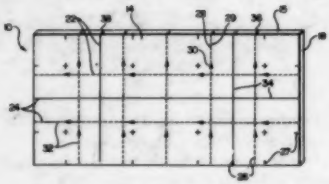
MATERIAL FOR USE IN FABRICATION

Louis K. Berg, Box 51, Sedalia, Alberta, Canada (T0J 3C0)

Filed Jul. 28, 1988, Ser. No. 225,542

Int. Cl.[5] B32B *3/02*

U.S. Cl. 428—195 **4 Claims**



1. In combination:

a. a roll of material for use in fabrication; and

b. reference markings on the roll of material spaced uniformly such that the markings can be used for measurement, the roll of material having reference numbers at regular interval adjacent the reference markings, such that the reference numbers designate the positioning of the adjacent reference marking relative to a primary reference point at the centre of the roll of material.

4,927,697

SURFACE MOUNTING LEADLESS COMPONENTS ON CONDUCTOR PATTERN SUPPORTING SUBSTRATES

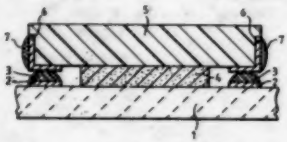
Peter F. IHill, Hatfield, England, assignor to British Aerospace Public Limited Company, London, England

Filed Nov. 28, 1988, Ser. No. 276,841

Claims priority, application United Kingdom, Nov. 28, 1988, 8727926

Int. Cl.[5] G32B *3/02*

U.S. Cl. 428—198 **5 Claims**



1. An assembly of a conductor pattern supporting substrate and a leadless component comprising:

a pad of adhesive material fixing the component to the substrate;

solder pillars between connection pads of the component and the conductor pattern on the substrate further fixing the component to said substrate such that a stand-off distance formed between the component and the substrate.

4,927,698

PUCKER AND SHRINK RESISTANT FLAME RETARDANT FABRIC FORMED OF CORESPUN YARNS

Pamela J. Jaco, Rock Hill, and Thomas W. Tolbert, Fort Mill, both of S.C., assignors to Springs Industries, Inc., Fort Mill, S.C.

Filed Mar. 15, 1989, Ser. No. 324,266

Int. Cl.[5] B32B *27/14*

U.S. Cl. 428—198 **14 Claims**

1. A fabric formed of corespun yarns having a core formed of fire-resistant filaments and a sheath formed of staple fibers and a cured, crosslinked coating on said fabric and imparting pucker and shrink resistance to the fabric, said coating comprising a first crosslinkable resin having an affinity for said core filaments and a second crosslinkable resin having an affinity for said sheath fibers and for said first crosslinkable resin.

4,927,699

PROCESS FOR PRODUCING A DECORATIVE FOIL OR SHEET CONTAINING A POLYMER PLASTIC, AND A FOIL OR PLASTIC PRODUCED BY THIS PROCESS

Gerhard Melcher, Vienna, Austria, assignor to Isovolta Osterreichische Isolierstoffwerke Aktiengesellschaft, Wiener Neudrof, Austria

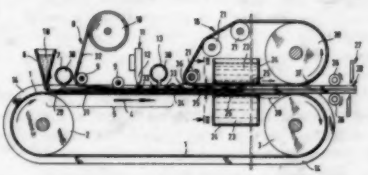
PCT No. PCT/AT87/00026, § 371 Date Dec. 14, 1987, § 102(e) Date Dec. 14, 1987, PCT Pub. No. WO87/06183, PCT Pub. Date Oct. 22, 1987

PCT Filed Apr. 14, 1987, Ser. No. 141,610

Claims priority, application Austria, Apr. 14, 1986, 957/86

Int. Cl.[5] B32B *27/10*

U.S. Cl. 428—203 **16 Claims**



1. Process for the continuous production of a decorative foil (38) containing a polymer plastic, in which at least one flat, porous and fibrous carrier is used, and which comprises a transparent protective layer of a polymer plastic on a decorative surface of the foil protecting a decorative layer at least at one of its surfaces, characterized by that a highly viscous polymer plastic on the basis of prepolymerizate of monomethyl methacrylate with a viscosity higher than 10,000 mPa.s is applied to a flat moving support to form a first separating layer, by that to this layer of highly viscous polymer plastic a low-viscosity liquid (30) consisting of at least one of the members of the group consisting of polymerizable monomer and prepolymer each on the basis of monomethyl methacrylate with a viscosity of less than 100 mPa.s is applied, which will fill any still free regions in said first separating layer and form over it a liquid layer (31), by the porous carrier material (32) which has a decorative surface is then applied onto this liquid layer (31), whereby it is dipped into said liquid layer, by that eventu-

ally thereupon a highly-viscous plastic on the basis of prepolymerizate of monomethyl methacrylate with a viscosity higher than 10,000 mPa.s is applied to form a second separating layer, and by that the thusly produced compound material (35) is transformed into the decorative foil under polymerization of the plastics contained in the said compound material, wherein one of the separating layers forms the transparent protective layer.

4,927,700

COPPER ETCHING PROCESS AND PRODUCT WITH CONTROLLED NITROUS ACID REACTION

Norvell J. Nelson, Palo Alto, and Phillip A. Martens, Fremont, both of Calif., assignors to PSI Star, Fremont, Calif.

Division of Ser. No. 159,727, Feb. 24, 1988, Pat. No. 4,846,918. This application Feb. 6, 1989, Ser. No. 293,877

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—209 8 Claims

1. In copper foil for use in a printed circuit board prepared by etching in a nitric acid solution: a material distributed within the copper foil for promoting the formation of nitrous acid from nitric acid in a controlled manner when the board is exposed to the nitric acid solution.

4,927,701

SHEET MOULDING COMPOUND AND A TOP FOR IT

René L. E. van Gasse, Opglabbeek, Belgium, assignor to DSM Resins B.V., AW Zwolle, Netherlands

Continuation of Ser. No. 16,204, Feb. 18, 1987, abandoned. This application Aug. 25, 1988, Ser. No. 236,289

Claims priority, application Netherlands, Feb. 27, 1986, 8600487

Int. Cl.[5] B32B *7/02, 27/08, 27/36*

U.S. Cl. 428—212 4 Claims

1. Sheet moulding compound (SMC) comprising:

a basic layer consisting of thermosetting material, fillers, fibers and customary additives, having at least one side of said basic layer provided with two layers, an intermediate layer and a top layer, the intermediate layer of which lies against the basic layer, the intermediate layer comprising at least fibre reinforcement and thermosetting material in a partly cured state said intermediate layer being capable of resisting the shear forces with the top layer that occur during moulding, and the top layer comprising the same or a different thermosetting material having no fiber reinforcement, which is in a cured state to a smaller extent than the intermediate layer.

4,927,702

THERMAL INSULATING MATERIAL

August Mühlratzer, Krailling; Karin Handrick, Dachau; Siegfried Lassmann, Gröbenzell, and Alfred Hirt, Munich, all of Fed. Rep. of Germany, assignors to Man Technologie AG, Munich, Fed. Rep. of Germany

Filed Feb. 9, 1988, Ser. No. 154,141

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1987, 3705440

Int. Cl.[5] B32B *7/02*

U.S. Cl. 428—215 7 Claims

1. A thermal insulating composite structure for high temperature use for protection against the effect of heat of short duration, said composite insulating structure comprising a plurality of superposed reflective layers comprising a substrate of relatively thin impregnated and fired ceramic fibers having

a thickness of 20–200 microns and a metal refracting coating of a thickness of about 0.2 microns on said substrate.

4,927,703

PROCESS FOR THE ANIONIC POLYMERIZATION OF ACRYLIC MONOMERS AND OPTIONALLY OF VINYL COMONOMERS

Philippe Teyssie, Neuville-En-Condroz; Sunil K. Varshney, Liege; Robert Jerome, Tilff, and Roger Fayt, Neupre, all of Belgium, assignors to Norsolor, Paris, France

Division of Ser. No. 134,373, Dec. 18, 1987, Pat. No. 4,826,941. This application Apr. 26, 1989, Ser. No. 343,349

Claims priority, application France, Dec. 19, 1986, 86 17790

Int. Cl.[5] B32B *7/02*

U.S. Cl. 428—220 6 Claims

1. A polymer comprising a homopolymer of 2,2,2-trifluorethyl methacrylate or a copolymer comprising at least one poly(2,2,2-tri-fluoroethyl methacrylate) block, said homopolymer or copolymer having a polydispersity between 1.1 and 4 and a number average molecular weight of between 10,000 and 300,000.

4,927,704

ABRASION-RESISTANT PLASTIC ARTICLES AND METHOD FOR MAKING THEM

Clive W. Reed, Scotia; Stefan J. Rzad, Rexford, and John C. Devins, Burnt Hills, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 11, 1989, Ser. No. 336,277

Int. Cl.[5] B05D *3/06*

U.S. Cl. 428—221 23 Claims

1. A method for preparing an abrasion-resistant plastic article, comprising plasma-enhanced chemical vapor deposition of an abrasion-resistant gradational layer onto a plastic substrate, wherein the composition of the gradational layer changes gradually in a direction perpendicular to the substrate surface from a composition consisting essentially of an interfacial material selected from the group consisting of organosilicon, organometallic, acrylic, and polyolefin materials, to a composition consisting essentially of an abrasion-resistant material selected from the group consisting of silicon dioxide, silicon nitride, silicon oxynitride, silicon carbide, silicon carbonitride, boron oxide, boron nitride, aluminum oxide, aluminum nitride, titanium dioxide, tantalum oxide, iron oxide, germanium oxide, germanium carbide, and mixtures thereof.

4,927,705

INSULATING LAMINATE

Robert W. Syme, 132 Curtis Crescent RR#4, King, Ontario, Canada (LOG 1KO), and Michael E. McKenna, 5191 Idlewood Crescent, Burlington, Ontario, Canada (L7L 3Y5)

Filed Aug. 8, 1988, Ser. No. 229,609

Int. Cl.[5] D04H *1/16*

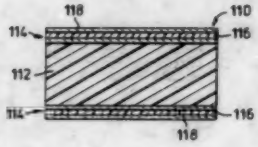
U.S. Cl. 428—282 9 Claims

1. A flexible, insulating laminate comprising:

heat insulating, flameproof ply of a soft, resilient, compressible polyester blanket having an inner face and an outer face, and

a vapour barrier ply comprising a moisture impermeable

polymer film having an inner side and an outer side, said inner side being bonded directly to said inner face of said



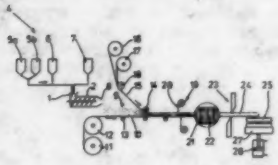
blanket by a bonding layer and said outer side supporting a coating of metal.

4,927,706

POST FORMING SEMI-FINISHED PRODUCT FOR THE MANUFACTURE OF MOULDED PARTS RESISTANT TO BENDING

Eberhard Born, Cologne, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 16, 1988, Ser. No. 155,981
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1987, 3706227
Int. Cl.[5] B32B *3/26*
U.S. Cl. 428—304.4 7 Claims



1. A post forming semi-finished product having sheet like dimensions for producing rigid molded parts by applying heat and compression of 1:2 to 1:6, the semi-finished product having flexible covering layers with a resin containing core between the layers, the covering layers comprising dry reinforcing mats having open spaces therein which extend in the direction of the core, the core including fixed debris material of individual three dimensional elements changeable in volume or form embedded in an uncured and storage stable resin, and the open spaces in the dry reinforcing mats being constructed and arranged to fill with the uncured and storage stable resin when the semi-finished product is post formed by application of heat and compression of 1:2 to 1:6.

4,927,707

COMBINATION OF SLIDE MEMBERS

Toshihiko Matsubara, and Taku Kitayama, both of Utsunomiya, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,424
Claims priority, application Japan, Sep. 8, 1987, 224598
Int. Cl.[5] B32B *5/16*; C22C *29/02*
U.S. Cl. 428—323 4 Claims

1. A combination of a first slide member and a second slide member to be held in sliding contact with each other, said combination comprising a first slide member made of a ferrous material in which at least a slide surface layer thereof has a metallurgical structure having granular carbides dispersed in a matrix phase, and a second slide member formed of cast steel having a chemical composition comprising:

C 0.8–2.0%,
Si 0.4–2.0%,
Mn 0.3–1.5%,
Cr 6.0–20.0%,
Mo 0.3–5.0%

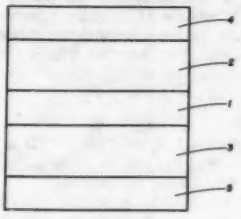
by weight, the remainder being Fe and impurities and in which at least a slide surface layer thereof has a metallurgical structure comprising network-like carbides dispersed in a martensite matrix phase obtained by high frequency quench hardening after casting.

4,927,708

FLEXIBLE STRETCH/SHRINK FILM

Vincent W. Herran, Greenville, and George D. Wofford, Duncan, both of S.C., assignors to W. R. Grace & Co.-Conn., Duncan, S.C.

Continuation of Ser. No. 36,750, Apr. 10, 1987, abandoned. This application Jul. 26, 1988, Ser. No. 225,588
Int. Cl.[5] B32B *27/32*, *27/06*
U.S. Cl. 428—332 4 Claims



1. In a multilayer thermoplastic packaging film having at least five layers, including a layer of linear low density polyethylene, the improvement wherein:

(a) a core layer comprises a very low density polyethylene;
(b) intermediate layers adjacent each side of the core layer comprise a linear low density polyethylene; and
(c) two outer layers each bonded to a respective intermediate layer comprise a very low density polyethylene;

wherein the film has a modulus at 73° F. of less than about 17,000 p.s.i. in the longitudinal and transverse directions.

4,927,709

HEAT TRANSFERABLE LAMINATE

Tim Parker, Shrewsbury; Robert M. Edwards, Milford; Frank A. Magnotta, Framingham, all of Mass.; Jean-Paul Laprade, Woonsocket, R.I.; Donald R. Smith, Hingham, Mass.; Eleanor H. Sodagar, Worcester, Mass.; John M. Anemaet, Millis, Mass.; Dennis R. Benoit, Woonsocket, R.I.; Earl K. Thornton, Jr., Andover, Mass., and Richard J. Galante, Milford, Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of Ser. No. 181,090, Apr. 13, 1988. This application Sep. 16, 1988, Ser. No. 245,760
Int. Cl.[5] C09J *7/02*
U.S. Cl. 428—352 18 Claims

1. A heat transferable laminate comprising a transfer substrate affixed to a carrier sheet for transfer from the carrier sheet to an article upon application of heat to the carrier sheet while said article contacts the transfer substrate, the carrier

sheet comprising a support sheet and a nonwax release layer consisting essentially of polyethylene coated over said support sheet, the nonwax release layer being in contact with said transfer substrate, said transfer substrate comprising a transfer coating and an ink design layer over the transfer coating, and a heat activatable adhesive layer over the ink design layer, the transfer coating being in contact with said nonwax release layer, said heat transfer laminate having the property that when a heat source is applied to the carrier for sufficient duration so that the nonwax release layer at least begins to soften while said transfer substrate contacts the article said transfer substrate separates cleanly from said nonwax release layer and transfers to said article, the heat transferable laminate having the additional property that no discernible portion of said nonwax release layer is transferred to the article along with said transfer substrate.

4,927,710

MATTING AGENT

Koji Tanaka; Minoru Ueda, and Taizo Masuda, all of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed Apr. 5, 1989, Ser. No. 333,582

Claims priority, application Japan, Apr. 21, 1988, 63-99675; Nov. 10, 1988, 63-284897; Jan. 23, 1989, 64-14543

Int. Cl.[5] B32B *27/02*

U.S. Cl. 428—394 **5 Claims**

1. A matting agent produced from fibers of a polymer containing acrylonitrile in a quantity more than 50 weight %, said fibers having a fiber diameter less than 100μ, a fiber length less than 0.3 mm, an aspect ratio less than 20, and a non-circular cross-sectional shape.

4,927,711

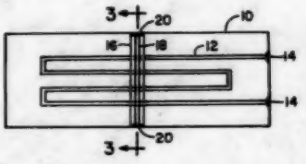
HYBRID CIRCUITS AND THICK FILM DIELECTRICS USED THEREIN

Gaylord L. Francis, and Francis W. Martin, both of Painted Post, N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Dec. 23, 1988, Ser. No. 289,260

Int. Cl.[5] B32B *17/06, 15/20, 18/00*

U.S. Cl. 428—432 **7 Claims**



1. A hybrid circuit comprising a substrate composed of a material having a coefficient of thermal expansion not over about 45×10^{-7}/°C. and selected from aluminum nitride, mullite and a cordierite glass-ceramic, and a thick film dielectric coated on the surface of said substrate, wherein the thick film dielectric has a composition essentially free of Na_2O, Li_2O and K_2O and consists essentially of, in percent by weight as calculated on an oxide basis, 15–45% ZnO, 3–15% MgO, 10–30% Al_2O_3, and 30–55% SiO_2 said film composed of a glass-ceramic having a primary crystal phase of willemite and a secondary phase of cordierite.

4,927,712

FUSIBLE CORE ALLOY COMPOSITES FOR PLASTICS MOLDING

Yoon O. Lhymn, and Chang Lhymn, both of Erie, Pa., assignors to Yoon Technology, Erie, Pa.

Continuation-in-part of Ser. No. 187,734, Apr. 27, 1988, which is a continuation-in-part of Ser. No. 166,060, Mar. 9, 1988. This application May 23, 1988, Ser. No. 197,170

Int. Cl.[5] B22C *12/00, 13/00, 13/02*

U.S. Cl. 428—614 **18 Claims**

1. A tin-based or tin-bismuth eutectic alloy matrix composite usable as a fusible core material in the lost core technology consisting essentially of:

(a) a tin-bismuth alloy matrix or a tin-lead antimony alloy matrix; and

(b) a reinforcing agent comprising metal shots.

4,927,713

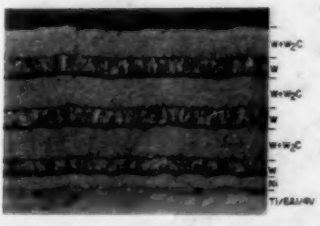
HIGH EROSION/WEAR RESISTANT MULTI-LAYERED COATING SYSTEM

Diwakar Garg, Macungie; Ernest L. Wreczics, Bethlehem; Leslie E. Schaffer, Macungie; Carl F. Mueller, Easton; Paul N. Dyer, Allentown, and Keith R. Fabregas, Easton, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 153,738, Feb. 8, 1989, Pat. No. 4,855,188. This application Aug. 2, 1989, Ser. No. 389,206

Int. Cl.[5] B32B *15/04*

U.S. Cl. 428—627 **16 Claims**



1. A highly erosion and abrasion wear resistant composite coating system on a substrate, said system comprising a plurality of composite layers,

each of said composite layers comprising a first layer toward said substrate of tungsten of sufficient thickness to confer substantial erosion and abrasion wear resistance characteristics on said coating system and a second layer away from said substrate of a mixture of tungsten and tungsten carbide wherein said tungsten carbide comprises W_2C, W_3C, or a mixture of both.

4,927,714

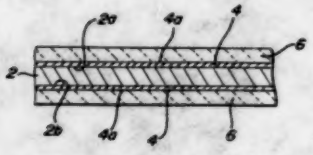
REFRACTORY METAL COMPOSITE COATED ARTICLE

Seymour Priceman, Seaford, N.Y., assignor to Barson Corporation, Troy, Mich.

Continuation of Ser. No. 86,023, Aug. 17, 1987. This application Mar. 13, 1989, Ser. No. 322,693

Int. Cl.[5] B32B *15/04*

U.S. Cl. 428—628 8 Claims



5. A coated article comprising a substrate of a refractory metal, an oxidation resistant intermetallic silicide layer fused in situ to the substrate and including by a reaction therewith an oxidation resistant silicide compound of the refractory metal, and a ceramic layer adhered to the intermetallic silicide layer and stable in high temperature oxidizing environments and at the interface with the silicide layer, said intermetallic silicide layer having a surface roughness of at least about 160 microinches RMS to promote adherence of the ceramic layer thereon.

4,927,715

OVERLAY ALLOY USED FOR A SURFACE LAYER OF SLIDING MATERIAL

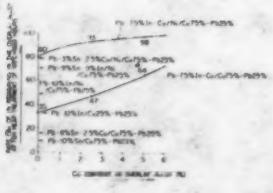
Sanae Mori, Nagoya, Japan, assignor to 501 Daido Metal Company Ltd., Nagoya, Japan

Continuation of Ser. No. 61,030, Jun. 11, 1987, abandoned, which is a continuation of Ser. No. 813,971, Dec. 27, 1985, abandoned. This application Mar. 31, 1989, Ser. No. 332,407

Claims priority, application Japan, May 22, 1985, 60-109627; Sep. 26, 1985, 60-213460

Int. Cl.[5] F16C *33/12*

U.S. Cl. 428—645 2 Claims



1. A composite sliding material comprising a backing metal, a layer of bearing alloy bonded to said backing metal, a bonding layer above said layer of bearing alloy, and a surface layer bonded to said bearing layer through said bonding layer,

said bearing alloy being selected from the group consisting of Al-Zn alloy and Al-Si alloy,

said bonding layer being selected from the group consisting of Cu and Cu-Zn, and

said surface layer being an alloy consisting essentially of, by weight, 0.1–6% Cu, 1–10% In, and the balance Pb and incidental impurities.

4,927,716

SURFACE TREATMENT FOR RECORDING MEDIA

Terence Goulding, Garswood, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Aug. 13, 1987, Ser. No. 84,855

Claims priority, application United Kingdom, Aug. 21, 1986, 8620339; Oct. 7, 1986, 8624021

Int. Cl.[5] G11B *5/64*

U.S. Cl. 428—695 8 Claims

1. A method for treating the surface of an electroless plated ferromagnetic recording layer to enhance its abrasion resistance, which comprises applying to the surface a dilute solution comprising 0.1 to 1% by weight of organic peroxide having carbon chains containing 8–20 carbon atoms in the absence of any organic material polymerisable by the peroxide solution.

4,927,717

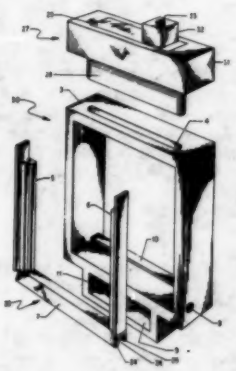
BIPOLAR METAL/AIR BATTERY

Homer L. Turley, Painesville; Marilyn J. Niksa, Concord; Gerald R. Pohto, Mentor, and Andrew J. Niksa, Concord, all of Ohio, assignors to ELTECH Systems Corporation, Boca Raton, Fla.

Division of Ser. No. 56,567, Jun. 1, 1987, Pat. No. 4,828,939. This application Apr. 3, 1989, Ser. No. 332,086

Int. Cl.[5] H01M *4/00, 2/14*

U.S. Cl. 429—27 11 Claims



1. A metal-air battery cell having an anode support comprising:

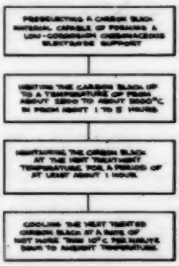
an elongated lower frame member of a generally inverted U-shape in cross-section upon which an anode rests when inserted into said anode support, said lower frame member having apertures extending from the chamber defined by said general inverted U-shape upwardly toward said anode along said frame member; and

a pair of upright, elongated side rails spaced apart, one from the other whereby each extend from an end of said lower frame member, with each side rail providing lateral support for an anode.

4,927,718
NOVEL AIR ELECTRODE FOR METAL-AIR BATTERY WITH NEW CARBON MATERIAL AND METHOD OF MAKING SAME

Philip N. Ross, Jr., Kensington, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 21, 1988, Ser. No. 209,397
Int. Cl.[5] H01M 4/86; C09C 1/56
U.S. Cl. 429—44 25 Claims

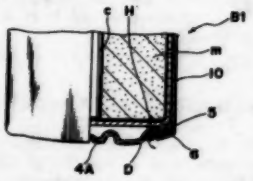


1. A corrosion-resistant carbonaceous electrode support material characterized by a corrosion rate of 0.03 wt.%/hour or less when measured at 550 millivolts vs. a Hg/HgO electrode in a 30 wt.% KOH electrolyte at 30° C., comprising a furnace-process carbon black material which has been heat-treated by heating the material to a temperature of from about 2500° to about 3000° C. over a period of from about 1 to about 5 hours in an inert atmosphere and maintained at this temperature for a period of at least about 1 hour in said inert atmosphere.

4,927,719
DRY CELL

Ryohei Ashihara, Neyagawa; Kikumitsu Suehiro, Kadoma; Kazuo Sugino, and Jun Miyoshi, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 29, 1988, Ser. No. 291,788
Claims priority, application Japan, Dec. 29, 1987, 62-334456
Int. Cl.[5] H01M 2/12
U.S. Cl. 429—54 5 Claims

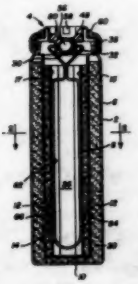


1. In a dry cell which comprises a raw cell having an opening proximate to the upper portion of said raw cell, said opening sealed by a sealing material, a bottom plate provided at the lower portion of said raw cell, a cap provided at the upper portion of said raw cell, a metal jacket conveying the outer periphery of said raw cell and subjected to laser-welding at its opposite butted ends, and a seal packing interposed between the lower edge of said metal jacket and a peripheral edge of said bottom plate, the improvement comprising a gas discharge mechanism provided at said peripheral edge of said bottom plate, and arranged to be normally closed by said seal packing and to be opened upon deformation by an increase of an internal pressure of the dry cell for discharging gas within the dry cell therethrough.

4,927,720
ELECTROCHEMICAL CELL HAVING A SAFETY VENT CLOSURE

Earl J. Chaney, Jr., Medina; Manuel R. Malay, Brunswick; Thomas J. O'Hara, Bay Village, and Alan D. Ayers, Westlake, all of Ohio, assignors to Eveready Battery Company, Inc., St. Louis, Mo.

Filed Oct. 13, 1989, Ser. No. 421,440
Int. Cl.[5] H01M 2/12
U.S. Cl. 429—54 20 Claims



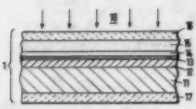
1. An electrochemical cell comprising active components of the cell assembled within a housing, said housing comprising a container having an open end closed by a cover and having at least one vent orifice defined by a wall in said housing; a bushing defining an axial opening and comprising an upper portion terminating with a thinner walled lower portion, said bushing disposed within and against the wall defining the vent orifice in said housing; a seal member having an external circumference smaller than the internal circumference of the opening defined in the upper portion of the bushing and larger than the internal circumference of the opening defined in the lower portion of the bushing; said seal member force-fitted within the lower portion of the bushing to seal the cell; and wherein at least one of said bushing and said seal member is resiliently deformable such that said seal member will be at least partially expelled from the vent opening upon a predetermined internal gas pressure buildup within the cell to provide a vent for the cell.

4,927,721

PHOTO-ELECTROCHEMICAL CELL

Michael Gratzel, chemin du Marquisat 7a - CH-1050, Sts. Sulpice, and Paul Liska, chemin des Bousons 47 - CH1018, Lausanne, both of Switzerland

Filed Oct. 7, 1988, Ser. No. 255,052
Claims priority, application Switzerland, Feb. 12, 1988, 00505/88
Int. Cl.[5] H01M 6/36
U.S. Cl. 429—111 15 Claims



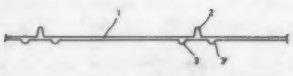
1. A regenerative photo-electrochemical cell comprising
a polycrystalline metal oxide semi-conductor having a surface with a roughness factor of more than 20; and
a monomolecular chromophore layer on said surface of said semi-conductor.

4,927,722

SEPARATOR FOR STARTER BATTERIES

Werner Böhnstedt, Henstedt-Ulzburg, and Werner Lindenstruth, Quickborn, both of Fed. Rep. of Germany, assignors to Grace G.m.b.H., Norderstedt, Fed. Rep. of Germany

Filed Jul. 28, 1989, Ser. No. 386,394
Claims priority, application Fed. Rep. of Germany, Sep. 9, 1988, 3830728; Feb. 10, 1989, 3903977
Int. Cl.[5] H01M 2/18
U.S. Cl. 429—147 28 Claims



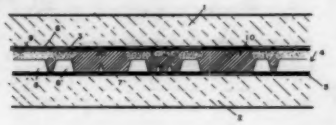
1. A battery separator comprising a sheet of elastic synthetic material, the sheet having a first side and a second side, the first side having a plurality of ribs arranged in pairs, the second side having a piurality ribs arranged as single, spaced apart ribs, the ribs on the second side being positioned between the pair of ribs on the first side so as to form a group of three associated ribs, the distance between each member of the pair of ribs on the first side being smaller than the distance between the adjacent groups of ribs.

4,927,723

RELIEF PRINTING PLATE MANUFACTURE

George B. Casdia, St. Albans, England, assignor to W. R. Grace Limited, London, England

Filed Jun. 7, 1988, Ser. No. 203,782
Claims priority, application United Kingdom, Jun. 17, 1987, 8714177
Int. Cl.[5] G03F 7/02; G03L 3/00
U.S. Cl. 430—15 16 Claims



1. A process for preparing a relief printing plate comprising image-wise exposing a surface of a layer (4;22) of uncured photocurable polymer to a negative pattern of the desired image to be printed, in order to form, on the exposed surface, cured relief printing areas (10) which correspond with the transparent regions (7b) of the negative (7) and uncured areas (8) which will correspond with recessed floor portions (9) at voids formed in register with the opaque portions (7a) of the negative; and exposing the uncured polymer (4;22) through its surface opposite the first-mentioned surface to harden the floor areas (9) and the support for the said cured relief areas (10); wherein the exposing through said other surface of the polymer includes image-wise exposing the opposite surface of the layer (4;22) to a positive (6) of the image to be printed, which positive is in substantial registration with said negative such that the opaque areas of said negative correspond in extent and position to the transparent areas of said positive, thereby exposing and curing the floor areas (9) of said layer which are substantially in register with said uncured areas (8) resulting from the negative exposure operation.

11. A process for preparing a flexographic relief printing plate comprising the steps of image-wise exposing a printing surface of a layer of uncured photocurable polymer to a negative pattern of the desired image to be printed, thereby forming a corresponding negative pattern of cured and uncured areas in said printing surface; image-wise exposing the surface of said layer opposite said printing surface to a positive pattern of said image which is in substantial registration with said negative pattern such that the opaque areas of said negative pattern substantially correspond in extent and position to the transparent areas of said positive pattern, thereby selectively exposing and curing the floor areas of said layer which are substantially in register with the uncured areas in said printing surface; and removing uncured polymer from said layer to form a relief image.

4,927,724

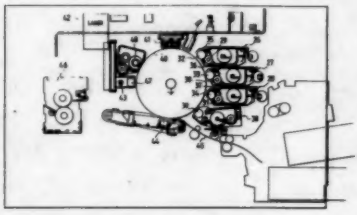
METHOD AND APPARATUS FOR COLOR ELECTROPHOTOGRAPHY

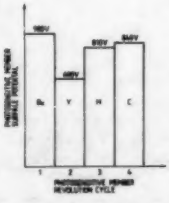
Hajime Yamamoto, Osaka; Yuji Takashima, Nishinomiya; Kazunori Kitagaki, Utsunomiya, and Masahiko Nakamura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 8, 1988, Ser. No. 269,751
Claims priority, application Japan, Nov. 18, 1987, 62-291055
Int. Cl.[5] G03G 13/01
U.S. Cl. 430—45 14 Claims

1. A method of color electrophotography comprising the steps of:
(a) performing a charging process, an exposure process, and a development process to form a toner image on a photosensitive member for each of a plurality of different colors, with the resulting toner images for the respective colors forming a composite color image, wherein yellow

toner image forming processes are effected subsequent to black toner image forming processes, wherein the black charging process charges the photosensitive member to a first potential, the yellow charging process charges the photosensitive member to a second potential and the sec-





ond potential is equal to or lower than the first potential, and wherein the charge on the photosensitive member resulting from the yellow toner image forming process is not removed by light exposure after the yellow toner image is formed; and

(b) transferring the composite color image to a sheet.

4,927,725

ELECTROPHOTOGRAPHIC METHOD

Hiroo Nishide, and Shintaro Kaneko, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1988, Ser. No. 281,375

Claims priority, application Japan, Dec. 14, 1987, 62-316853

Int. Cl.[5] G03G *13/01, 13/22*

U.S. Cl. 430—54 **3 Claims**

1. A method of making an electrophotographic reproduction copy of an original document comprising the steps of:

forming a first image with latent image forming parameters made suitable for higher print density portion reproduction;

transferring said first image onto paper;

forming a second image with latent image forming parameters made suitable for lower print density portion reproduction; and

transferring said second image onto said paper so that said second image is superimposed over said first image.

2. A method of making a color electrophotographic reproduction copy of an original color document comprising the steps of:

forming a first image with latent image forming parameters made suitable for higher print density portion reproduction of a first color component of said original color document and transferring said first image onto paper;

forming a second image with latent image forming parameters made suitable for lower print density portion reproduction of said first color component and transferring said second image onto said paper so that said second image is superimposed over said first image;

forming a third image with latent image forming parameters made suitable for higher print density portion reproduction of a second color component of said original color document and transferring said third image onto said paper so that said third image is superimposed over said second image;

forming a fourth image with latent image forming parameters made suitable for lower print density portion reproduction of said second color component and transferring said fourth image onto said paper so that said fourth image is superimposed over said third image;

forming a fifth image with latent image forming parameters made suitable for higher print density portion reproduction of a third and last color component of said original color document and transferring said fifth image onto said paper so that said fifth image is superimposed over said fourth image;

forming a sixth and last image with latent image forming parameters made suitable for lower print density portion reproduction of said third and last color component and transferring said sixth and last image onto said paper so that said sixth image is superimposed over said fifth image.

4,927,726

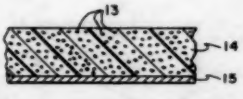
PHOTORECEPTOR WITH POLYNUCLEAR BISOXAZOLE OR BISTHIZOLE

Michael Scozzafava; Ching W. Tang, and Ralph H. Young, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

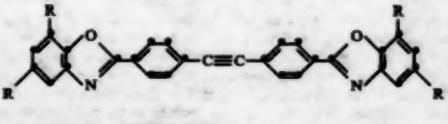
Filed Aug. 17, 1988, Ser. No. 232,974

Int. Cl.[5] G03G *5/06, 5/14*

U.S. Cl. 430—78 **3 Claims**



1. A photoreceptor comprising at least one non-charge-injecting contact in a charge-collecting relationship with a solid phase consisting essentially of a compound having the formula



wherein R is $-C(CH_3)_2C_2H_5$.

4,927,727
THERMALLY ASSISTED TRANSFER OF SMALL ELECTROSTATOGRAPHIC TONER PARTICLES

Donald S. Rimai, Webster, and Chandra Sreekumar, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 9, 1988, Ser. No. 230,394
Int. Cl.[5] G03G *13/14, 13/16*
U.S. Cl. 430—99 **19 Claims**

1. In method of making a hard copy wherein a latent electrostatic image on an image-bearing substrate is developed by applying to said image dry thermoplastic charged toner particles comprising a toner binder, and said developed image is transferred to the surface of a receiver by contacting said developed image on said substrate with said surface, then removing said surface from said substrate, the improvement which comprises

(A) developing said latent electrostatic image with a toner having a particle size of less than 8 micrometers;

(B) heating said surface before it contacts said developed image, to a temperature such that said surface heats said toner particles when it contacts said developed image to a temperature between 10° C. above the T_g of said toner binder and 20° C. below the T_g of said toner binder, where said temperature is sufficient to fuse discrete toner particles that form said image to each other at points of contact between said particles, but insufficient to cause said contacting particles to flow into a single mass;

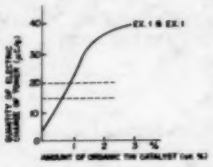
(C) non-electrostatically transferring said developed image to said surface, where said surface has a roughness average less than the radius of said toner particles; and

(D) heating said developed image after it has been removed from said substrate to a temperature sufficient to fuse it to said surface.

4,927,728
CARRIER PARTICLES FOR USE IN A TWO-COMPONENT DRY-TYPE DEVELOPER

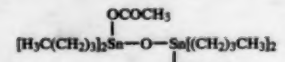
Tetsuo Isoda; Yoichiro Watanabe; Nobuhiro Nakayama, and Mitsuo Aoki, all of Shizuoka, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 656,115, Sep. 28, 1984, abandoned. This application Nov. 23, 1988, Ser. No. 276,279
Claims priority, application Japan, Oct. 4, 1983, 58-185517
Int. Cl.[5] G03G *9/10*
U.S. Cl. 430—108 **6 Claims**



1. Carrier particles for use in two-component dry-type developers for electrophotography, comprising: core particles coated with a hardened silicone resin having a three-dimensional network structure comprised of Si-O-Si bonds, said core particles being made of a material selected from the group consisting of a magnetic metal, a non-magnetic metal and a non-metallic material, with the particle size thereof being in the range of 30 μm to 1,000 μm, said carrier particles having been prepared by dissolving an organosiloxane capable of forming said silicone resin and an organic tin catalyst capable of catalyzing hardening of said silicone resin in an organic solvent to form a silicone varnish, then coating said core particles with said varnish and drying said varnish to form coatings on said core particles, then heating said coated core particles at a temperature in the range of about 100° C. to about 250° C. to harden the silicone resin, said organic tin catalyst being selected from the group consisting of:

(No. 1) $R_2Sn(OCOR')_2$ wherein R and R' each represent an alkyl group of $C_1 \sim C_{12}$.



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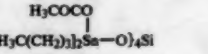

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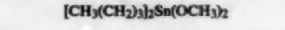

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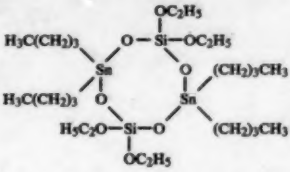

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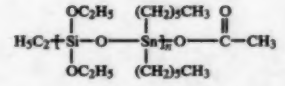

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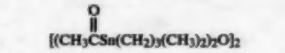


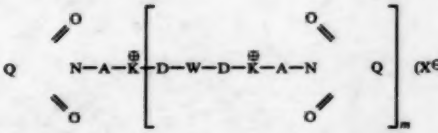
(No. 7)

4,927,729
COLORLESS SALTS OF HETEROPOLYACIDS AS CHARGE CONTROL SUBSTANCES IN TONERS

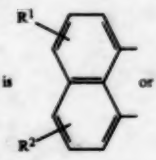
Horst Harnisch, Much, and Roderich Raue, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 3, 1988, Ser. No. 266,554
Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738948
The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.
Int. Cl.[5] G03G *9/08; C07F 5/06, 7/02, 11/00*
U.S. Cl. 430—110 **7 Claims**

1. Heteropolyacid salts of the formula



in which Q is



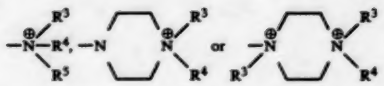
or

R^1 and R^2 independently of one another are hydrogen, chlorine, bromine, hydroxyl, C_1- to C_4-alkoxy, nitro or carboxyl,

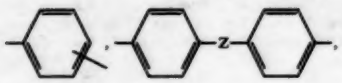
A is C_1- to C_5-alkylene or $-C_6H_4-CH_2-$ (m- or p-),

m is 0 or 1,

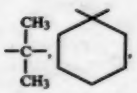
n is 1 or 2,
K^+ is



R^3 is C_1- to C_{24}-alkyl, carbamoyl-C_1- to C_2-alkyl, C_1- to C_4-alkoxycarbonyl-C_1- to C_2-alkyl, benzyl, cyclohexyl or allyl,
R^4 is C_1- to C_4-alkyl or a single bond linked to D,
R^5 is C_1- to C_4-alkyl,
D is $—CH_2—$, $—CH_2—CO—$, $—CH_2—CO—NH—$ or $—CH_2—CO—NH—CH_2—$,
W is



CO or a single bond,
Z is $—CH_2—$,



—O—, —S—, $—SO_2—$ or a single bond and
$X^{\ominus}$ is an anion of a heteropolyacid based on tungsten and/or molybdenum containing phosphorus, silicon, vanadium, cobalt, nickel, manganese, chromium and/or aluminium.

5. Electrographic toners containing as the cationic charge-reinforcing additive a salt according to claim 1.

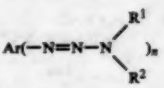
4,927,730

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT AND POLYMERIZABLE COMPOUND

Kazo Sato, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 27, 1987, Ser. No. 43,121
Claims priority, application Japan, Apr. 25, 1986, 61-96339
The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.
Int. Cl.[5] G03C 1/68, 1/72
U.S. Cl. 430—138 **14 Claims**

1. An image-forming method which comprises:
imagewise exposing a light-sensitive material comprising a light-sensitive layer provided on a support wherein the light-sensitive layer contains silver halide, a reducing agent, a polymerizable compound and a triazene compound having the following formula:



in which Ar is an aryl group or a heterocyclic group, each of which may have one or more substituent groups; each of R^1 and R^2 independently is a group selected from the group consisting of hydrogen, an alkyl group, a cycloalkyl group, an aralkyl group, an alkenyl group, an aryl group and a heterocyclic group, each of which may have one or more substituent groups, or R^1 and R^2 form, together with the neighboring nitrogen, a heterocyclic group which may have one or more substituent groups; and n is 1, 2 or 3, to form a latent image of the silver halide;
simultaneously or thereafter developing the light-sensitive material to polymerize the polymerizable compound within the area where the latent image of the silver halide has been formed, and thereby fixing the triazene compound on the support within the area;
pressing the light-sensitive material on an image-receiving material comprising an image-receiving layer containing an acid color developer and a coupler provided on a support to transfer the unfixed triazene compound to the image-receiving material; and
heating the image-receiving material to accelerate the reaction of the triazene compound with the acid color developer and the coupler.

4,927,731

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT POLYMERIZABLE COMPOUND, AND POLAR COMPOUND

Ryuichi Takahashi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 30, 1988, Ser. No. 175,456
Claims priority, application Japan, Mar. 30, 1987, 62-77320; Apr. 10, 1987, 62-87998
Int. Cl.[5] G03C 1/68, 1/72
U.S. Cl. 430—138 **8 Claims**

1. A light-sensitive material comprising a support and a light-sensitive layer containing silver halide, a reducing agent, an ethylenically unsaturated polymerizable compound and a base or base precursor, said silver halide, reducing agent and polymerizable compound being contained in microcapsules which are dispersed in the light-sensitive layer, and said base or base precursor being arranged outside of the microcapsules,
wherein the light-sensitive layer contains a polar compound having a melting point in the range of 30° to 250° C., said polar compound being arranged inside and outside of the microcapsules, and said polar compound arranged outside of the microcapsules is present in an amount of from 3 to 30 weight percent and
wherein the reducing agent, the polar compound contained in the microcapsules, the polar compound arranged outside of the microcapsules and the base or a base formed from the base precursor have pKa values satisfying the conditions of the formulas (V) and (VI):

$$D \leqq E \leqq G \quad (V)$$

$$D \leqq F \leqq G \quad (VI)$$

in which D represents the pKa value of the reducing agent; E represents the pKa value of the polar compound contained in the microcapsules; F represents the pKa value of the polar compound arranged outside of the microcapsules; and G represents the pKa value of the base or a base formed from the base precursor and wherein said microcapsules contain said polar compound in an amount of from 0.1 to 1.0 mole based on one mole of the reducing agent.

4,927,732

POSITIVE-WORKING PHOTOSENSITIVE COMPOSITION CONTAINING A DYE AND POSITIVE-WORKING PHOTOSENSITIVE RECORDING MATERIAL PREPARED THEREFROM

Hans-Joachim Merrem, Seeheim-Jugenheim; Gerhard Buhr, Koenigstein, and Ruediger Lenz, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 20, 1988, Ser. No. 260,307

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735852

Int. Cl.[5] G03C *1/60, 1/495*

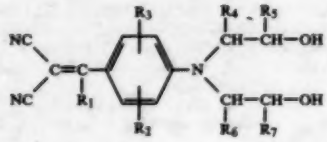
U.S. Cl. 430—191 **21 Claims**

1. Positive-working photosensitive composition comprising, in admixture:

a positive-working photosensitive compound in an amount sufficient to render exposed areas soluble in a developer, said compound being selected from the group consisting of (1) an o-quinone diazide and (2) a combination of photolytic acid donor with an acid-cleavable compound,

a binder that is isoluble in water and soluble or swellable in an aqueous-alkaline solution, present in an amount such that said composition forms a uniform film when applied to a substrate, and

a dye comprising a non-bleachable compound that absorbs light in the region of actinic radiation to which the photosensitive compound responds and corresponds to the general formula I



(I)

wherein

R_1 denotes hydrogen, alkyl, aryl, alkoxy or nitrilo,

R_2 and R_3 are identical or different and denote hydrogen, hydroxy, alkyl, aryl, alkoxy, aryloxy, nitrilo, amino, alkylamino or halogen, and

R_4, R_5, R_6 and R_7 are identical or different and denote hydrogen, hydroxy, alkyl, aryl, alkoxy, aryloxy, amino, alkylamino or halogen

wherein said dye is present in an amount sufficient to significantly reduce the effects of reflection when said composition is coated on a substrate and exposed.

4,927,733

CONFORMATION OF VACUUM - LAMINATED SOLDER MASK COATED PRINTED CIRCUIT BOARDS BY FLUID PRESSURIZING

Gary K. Stout, Gloucester, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 23, 1988, Ser. No. 288,915

Int. Cl.[5] G03C *1/74*

U.S. Cl. 430—256 **18 Claims**

1. A method of obtaining a substantially void free interface between a light sensitive dry film on a substrate having a raised relief comprising the steps of:

(a) vacuum laminating the light sensitive dry film onto the substrate;

(b) releasing the vacuum to obtain at ambient pressure a laminate of the photosensitive film on the subetrate whereby voids are present at an interface between the substrate and the laminated film;

(c) applying uniform elevated pressure of at least 0.3 atmospheres above ambient to the entire substrate with the dry film laminate by a pressurized fluid whereby voids entrapped in the substrate surface-dry film interface are eliminated; and

(d) releasing the uniform elevated pressure.

4,927,734

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL AND A PROCESS FOR FORMING A HIGH CONTRAST PHOTOGRAPHIC IMAGE

Shuji Rokutanda, Tokyo; Yasuo Higemitsu, Ohmiya; Akiyoshi Tsuchida, Kitamoto, and Yukihiro Yamakoshi, Urawa, all of Japan, assignors to Dainippon Ink. and Chemicals, Inc., Tokyo, Japan

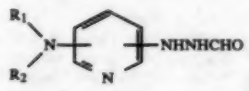
Filed Nov. 21, 1988, Ser. No. 274,223

Claims priority, application Japan, Dec. 25, 1987, 62-326855

Int. Cl.[5] G03C *1/33*

U.S. Cl. 430—264 **61 Claims**

1. A silver halide photographic light-sensitive material containing at least one negative-working silver halide photographic emulsion layer comprising substantially surface latent image type monodispersed silver halide grains, said material containing a compound represented by formula I or II:



[I]

[II]

wherein each of R_1, R_2, R_3 and R_4 represents a hydrogen atom, a substituted or unsubstituted alkyl group, or a substituted or unsubstituted aryl group provided that if one of R_3 and R_4 is a hydrogen atom, the other cannot be a hydrogen atom.

4,927,735

NOVEL NAPHTHALOCYANINE DYE, METHOD FOR PREPARING THE SAME, AND OPTICAL INFORMATION RECORDING MEDIUM EMPLOYING THE SAME

Susumu Era; Setsuo Kobayashi, and Akio Mukoh, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

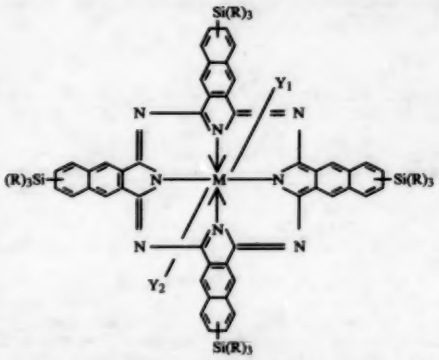
Filed Dec. 31, 1987, Ser. No. 140,248

Claims priority, application Japan, Jan. 7, 1987, 62-452

Int. Cl.[5] G11B *7/24;* B41M *5/26;* G03C *1/72;* C07D *487/22*

U.S. Cl. 430—270 **12 Claims**

1. A novel naphthalocyanine dye represented by the following general formula (I):



(I)

wherein R is an alkyl group having 1 to 22 carbon atoms or an aryl group and three Rs may be the same or different; M is selected from the group consisting of Si, Al, Ti, Ge and Sn;

Y_1 and Y_2 are selected from the group consisting of OR', OAr, $OSi(R')_3$, OSi $(Ar)_3$ and $OC(Ar)_3$ and may be the same or different, with the proviso that when M is Al, Y_1 alone should be bound to M and Y_2 is absent, in which R' is an alkyl group having 1 to 22 carbon atoms, and

Ar is an aryl group or an aralkyl group.

4,927,736

HYDROXY POLYIMIDES AND HIGH TEMPERATURE POSITIVE PHOTORESISTS THEREFROM

Werner H. Mueller, East Greenwich, and Dinesh N. Khanna, West Warwick, both of R.I., assignors to Hoechst Celanese Corporation, Summit, N.J.

Filed Jul. 21, 1987, Ser. No. 76,098

Int. Cl.[5] G03C *1/495, 5/16*

U.S. Cl. 430—275 **36 Claims**

20. A positive working photoresist composition comprising a radiation sensitizer and a polyimide condensation product of at least one aromatic dianhydride and at least one hydroxy substituted aromatic diamine.

24. A photosensitive article comprising a support substrate having coated thereon a positive working photoresist composition according to claim **20**.

4,927,737

RADIATION POLYMERIZABLE COMPOSITION AND ELEMENT CONTAINING A PHOTOPOLYMERIZABLE ACRYLIC MONOMER

John E. Walls, Hampton; Carlos Tellechea, Shrewsbury, and Major S. Dhillon, Belle Mead, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Division of Ser. No. 762,010, Aug. 2, 1985, Pat. No. 4,780,392. This application May 26, 1988, Ser. No. 199,012

Int. Cl.[5] G03C *1/94, 1/76, 5/16, 1/78*

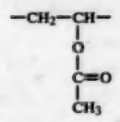
U.S. Cl. 430—278 **22 Claims**

1. A photographic element comprising a substrate, having coated thereon a radiation-polymerizable composition comprising in admixture

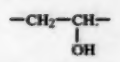
(a) a binder resin having the general formula

—A—B—C—

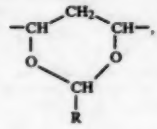
wherein a plurality of each of components A, B and C occur in ordered or random sequence in the resin and wherein A is present in said resin at about 5% to about 20% by weight and comprises groups of the formula



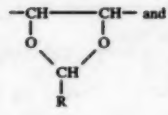
B is present in said resin at about 4% to about 30% by weight and comprises groups of the formula



and C is present in said resin at about 50% to about 91% by weight and comprises acetal groups consisting of groups of the formulae



(I)



(II)

(III)

where R is lower alkyl or hydrogen, and wherein said group I is present in component C from about 75% to about 85%, group II is present in component C from about 3% to about 5%; and group III is present in component C from about 10% to about 22%;

(b) a photoinitiator; and

(c) an acrylic monomer having one or more unsaturated groups.

2. The photographic element of claim **1**, further comprising and a transparent, continuous, oxygen barrier film on said composition.

3. The photographic element of claim **2** wherein said substrate is selected from the group consisting of aluminum and its alloys, polyester and silicon.

4,927,738

CONJUGATED DIENE COPOLYMER, PROCESS FOR PRODUCING THE SAME, AND PHOTOSENSITIVE RESIN COMPOSITION COMPRISING THE SAME

Shin-ichiro Iwanaga; Tatsuaki Matsunaga; Ituo Nishiwaki, all of Yokkaichi, and Hiroji Enyo, Suzuka, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Nov. 24, 1987, Ser. No. 124,870

Claims priority, application Japan, Dec. 26, 1986, 61-308133

Int. Cl.[5] C08F *2/50, 265/06, 267/06;* **G03C** *1/68*

U.S. Cl. 430—286 **10 Claims**

1. A photosensitive resin composition comprising (I) a conjugated diene copolymer comprising (A) 40 to 90 mole % of a conjugated diene component, (B) 0.5 to 10 mole % of an alpha, beta-ethylenically unsaturated carboxylic acid component, (C)

0.1 to 5 mole % of a polyfunctional alkenyl compound component not in component (A) and selected from the group consisting of esters of polyhydric alcohols with acrylic and methacrylic acids, divinylbenzene and trivinylbenzene and (D) 5 to 58 mole % of a monoolefinically unsaturated compound component other than one from component (B), in which copolymer the intrinsic viscosity as measured at 30° C. in demethylformamide is 0.01 to 3.0 dl/g, the width (αTg) of the endothermic transition temperature section determined by a differential scanning calorimetry is 45° to 120° C. and the limit temperature (T_1) on the lower temperature side of the endothermic transition temperature section is −40° C. or less (II) a photopolymerizzable unsaturated compound monomer and (III) a photosensitizer, wherein said copolymer is prepared by polymerizing a monomer mixture of (a) 30–90% by weight of said conjugated diene monomer, (b) 0.5–10% by weight of said alpha, beta-ethylenically unsaturated carboxylic acid monomer, (c) 0.1–10% by weight of said polyfunctional alkenyl compound monomer and (d) 5–65% by weight of said monoolefinically unsaturated compound monomer, wherein (a)+(b)+(c)+(d)=100% by weight, in the presence of a radical polymerization initiator, wherein all of component (a) is initially added, and 20–100% by weight of the above amount of component (b), 20–80% by weight of the above amount of component (c) and 1–50% by weight of the above amount of component (d) are post-added at one time or continuously when the polymerization conversion of the initially added monomers has reached 20–85%.

4,927,739

PHOTOSENSITIVE COMPOSITION CONTAINING A GELLING AGENT

Masaharu Taniguchi, Shiga; Chikara Ichijo, Kashiwa, and Junichi Fujikawa, Kyoto, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Oct. 19, 1987, Ser. No. 109,561

Int. Cl.[5] G03C *1/68, 1/70, 1/71*

U.S. Cl. 430—286 **15 Claims**

1. A photosensitive composition containing a photoreactive monomer or oligomer; and a photoreaction initiator; and containing at least one compound selected from the group consisting of N-acyl amino acid derivatives and condensates of an aliphatic or aromatic aldehyde with a polyhydric alcohol having 2 to 40 carbon atoms.

2. A photosensitive composition containing a polyolefin or polyene having a number-average molecular weight of 30,000 to 500,000; a photoreactive monomer or oligomer; and a photoreaction initiator; and containing at least one compound selected from the group consisting of N-acyl amino acid derivatives, condensates of an aliphatic or aromatic aldehyde with a polyhydric alcohol having 2 to 40 carbon atoms, 12-hydroxystearic acid and condensates of polysaccharides with a fatty acid having 8 to 20 carbon atoms.

5. A photosensitive composition containing an alcohol-soluble polyamide or polyesteramide; a photoreactive monomer or oligomer; and a photoreaction initiator; and containing at least one compound selected from the group consisting of N-acyl amino acid derivatives, condensates of an aliphatic or aromatic aldehyde with a polyhydric alcohol having 2 to 40 carbon atoms, 12-hydroxystearic acid and its derivatives, acylated polysaccharides and a metallic soap.

12. A photosensitive composition containing an alcohol-soluble polyamide or polyester amide; a photoreactive monomer or oligomer; and a photoreaction initiator; and containing at least one compound selected from the group consisting of N-acyl amino acid amide, condensates of a benzaldehyde with a D-sorbitol and 12-hydroxystearic acid.

13. A photosensitive composition containing an alcohol-soluble polyamide or polyesteramide; a photoreactive monomer or oligomer at least partly comprising a polyene having a number-average molecular weight of 500 to 20,000; and a photoreaction initiator; and containing at least one compound selected from the group consisting of N-acyl amino acid derivatives, condensates of an aliphatic or aromatic aldehyde with a polyhydric alcohol, hydroxycarboxylic acids having 8 to 20 carbon atoms and their derivatives, acylated polysaccharides and metallic soap.

4,927,740

CLOSING AND/OR SEALING ORIFICES, CAVITIES OR SPACES IN PRINTING PLATES MOUNTED ON PLATE CYLINDERS

Guenter Wallbillich, Neustadt; Gerhard Bleckmann, Lampertheim, and Dankmar Scholz, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 21, 1988, Ser. No. 262,629

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1987, 3736180

Int. Cl.[5] G03F *7/02; G03C 1/68*

U.S. Cl. 430—309 **9 Claims**

1. A process for closing and sealing orifices, cavities or spaces, which are formed when printing plates are mounted on a plate cylinder, which comprises: applying to the orifices, cavities or spaces a sealing or closing compound which is a pasty, photocurable compound which is viscoplastic at room temperature and essentially consists of a photopolymerizable mixture of

(a) from 10 to 50% by weight of one or more photopolymerizable, ethylenically unsaturated low molecular weight compounds,

(b) from 25 to 50% by weight of a mixture of the components 1) a styrene/maleic half-ester copolymer or a linear soluble copolyamide, and 2) at least one unsaturated polyester, which components are compatible with the photopolymerizable low molecular weight compounds of component (a),

(c) from 0.01 to 10% by weight of one or more photopolymerization initiators and

(d) from 3 to 40% by weight of one or more finely divided oxidic fillers which, when mixed with components (a) to (c) give mixtures which are transparent to long-wavelength UV light, with the proviso that the sum of the percentages stated under (a) to (d) is 100,

and thereafter exposing the photopolymerizable mixture in the orifices, cavities or spaces to be closed or sealed, to actinic light.

4,927,741

PROCESSING OF EXPOSED LITHOGRAPHIC PRINTING PLATES BY CONDUCTING SECOND EXPOSURE UNDER WATER

Peter Garth; Stuart M. Simpson, both of Leeds, United Kingdom; John E. Parkinson, Lincoln, Nebr., and Alan H. Rogers, Stockport, England, assignors to Horsell Graphic Industries Limited, Leeds, England

Continuation of Ser. No. 25,414, Mar. 13, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 274,730

Claims priority, application United Kingdom, Mar. 13, 1986, 8606258

Int. Cl.[5] G03C *5/24; G03F 7/08, 7/26*

U.S. Cl. 430—309 **5 Claims**

1. A method for the reversal of photosoluble lithographic printing plates having a light sensitive coating at one surface, comprising the successive steps of:

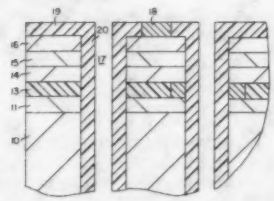
(i) imagewise exposing a portion of the coated surface to render said portion soluble in developer;
(ii) heating the plate to render the imagewise exposed portion relatively insoluble in the developer;
(iii) overall irradiating the coated surface to solubilize the remaining portion of the coated surface not previously exposed, after said heating step; and
(iv) promoting easier solubilization of the remaining portion of the coated surface during said step of overall irradiating by:
(A) applying water over the coated surface; and
(B) applying the overall irradiation of step (iii) through the applied water.

4,927,742

MULTILAYER PRINTED WIRING BOARDS

Thomas S. Kohm, Huntington, N.Y., assignor to Kollmorgen Corporation, Simsbury, Conn.

Division of Ser. No. 280, Jan. 14, 1987, Pat. No. 4,804,575. This application Nov. 23, 1988, Ser. No. 275,358
Int. Cl.[5] G03C *5/00*
U.S. Cl. 430—311 **8 Claims**



1. A process for manufacturing a multilayer printed wiring board comprising:
establishing at least one inner layer conductive pattern on an organic insulating base material;
coating at least a portion of the inner layer conductive pattern and the insulating base material with a primer coating composition which when cured firmly bonds to the conductive pattern and the base material, said primer coating composition comprising:
the product of reacting between 20 to 60% by weight of a poly(vinyl-acetal) resin with 80–40% by weight phenolic resin in the presence of an acidic catalyst;
a coupling agent having at least two amino substituted aromatic groups covalently bonded to a titanium or zirconium central atom via an oxygen containing linkage, said coupling agent being capable of coupling to a metal surface and capable of reacting with the phenolic resin, said coupling agent being present in the composition in an amount sufficient to couple the poly(vinyl acetal)-phenolic resin reaction product to the metal surface; and
sufficient organic solvent to dissolve the resins and coupling agent and establish a viscosity for the coating composition suitable for applying the coating composition to a substrate;
curing said primer coating composition thereon;
applying an organic dielectric insulating layer on the primer coating;
curing said insulating layer thereon and firmly bonding it thereto;
applying a bonding composition for adherently plating metal thereon over said organic dielectric insulating layer, said bonding composition comprising:
a phenolic resin, said resin being substantially free of methyl ether groups, having an average of between four and ten phenolic rings per molecule and at least two methylol functional groups;
at least one heat resistant polymer having an aromatic or cyclic backbone and functional groups capable of cross-linking with phenolic methylol groups without evolving water, said heat resistant polymers being present in an amount sufficient to react with substantially all the methylol groups of the phenolic resin, said polymer with aromatic or cyclic backbone being capable of improving the electrical or heat resistant properties of said bonding composition;
an elastomer selected from the group consisting of neoprene, nitrile rubber and chlorosulfonated polyethylene, and vinyl and acrylic elastomers, said elastomer being 30 to 60% of the combined weight of the phenolic and heat resistant resins and elastomer;
the bonding composition capable of being applied onto a printed wiring base material and cured to a solid thermoset composition and when cured capable of being adhesion promoted for adherent metal deposition, and capable of maintaining the bond of a deposited metal for at least 10 seconds at a temperature of 430° C.;
curing said bonding composition thereon;
plating a metallic conductive pattern securely adhered to said bonding composition creating a multilayer printed wiring board, said multilayer board having adhesion between said 5 layers capable of withstanding exposure to at least 5 soldering cycles of at least 255° C. for 2 seconds without blistering or delamination between the layers when the conductive patterns are unperforated metal planes, the planes having areas up to 75 mm×75 mm.

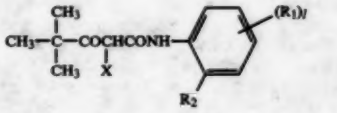
4,927,743

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS HAVING SPECIFIED COUPLER, DIR COUPLER AND SILVER COVERAGE

Koji Tamoto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 26, 1988, Ser. No. 160,971
Claims priority, application Japan, Feb. 27, 1987, 62-44789
Int. Cl.[5] G03C *1/46, 1/06, 7/32*
U.S. Cl. 430—496 **10 Claims**

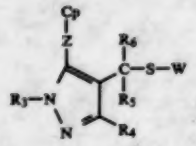
1. A silver halide color photographic light-sensitive material comprising a support having provided thereon one or more blue-sensitive layers each containing a yellow coupler, one or more green-sensitive layers each containing a magenta coupler, one or more red-sensitive layers each containing a cyan coupler and one or more protective layers provided on the side of the support and further from the support than the color-sensitive layer which is furthest away from the support, the thickness of the total photographic layers provided on the support from the color-sensitive layer located closest to the support to the protective layers, inclusive, being 18 μm or less, wherein at least one of said yellow coupler is a compound represented by formula (I)



(I)

wherein R_1 represents a halogen atom, an aliphatic group, an aromatic group, an aliphatic oxy group, an aromatic oxy group, a carboxylamido group, a sulfonamido group, a carbamoyl group, a sulfamoyl group, an acyloxy group, a substituted amino group, an aliphatic thio group, a ureido group, a sulfamoylamino group, a cyan group, an aliphatic oxycarbonyl group, an aliphatic oxycarbonylamino group, an imido group, an aliphatic sulfonyl group, an aromatic sulfonyl group or a heterocyclic group; R_2 represents a hydrogen atom, a halogen atom or an aliphatic oxy group; X represents a hydrogen atom or a group which is eliminated by a coupling reaction with the oxidized form of a primary aromatic amine based developing

agent; l represents 0 or an integer of from 1 to 4; and wherein said light-sensitive photographic material further contains a compound represented by formula (II)



(II)

wherein Cp represents a coupling component which is able to react with the oxidized form of a primary aromatic amine based developing agent; R_3 represents a hydrogen atom, an alkyl group, an aryl group, an acyl group, a sulfonyl group, an alkoxycarbonyl group or a heterocyclic group; R_4 represents a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an amino group, a carboxylamido group, a sulfonamido group, a carboxyl group, an alkoxycarbonyl group, a carbamoyl group or a cyano group; R_5 and R_6 each represents individually hydrogen atoms, alkyl groups or aryl groups; W represents a group which forms, together with the sulfur atom when the thioether bond is eliminated, a compound which has a development inhibiting action; and Z is bonded to the coupling position of Cp and represents an —O— group, an —S— group or an

group, wherein R_7 represents a hydrogen atom, an alkyl group, an acyl group or a sulfonyl group, wherein the amount of silver contained in the light-sensitive material is 5.5 g/m^2 or less and wherein the amount of silver iodide in the silver halide contained in the light-sensitive material is 2 to 40 mol %, and wherein at least one of said yellow, magenta and cyan couplers is incorporated by using a dispersion method in which a high boiling point solvent as the coupler dispersion medium is dispersed in an amount such that the weight ratio with respect to the coupler is not more than 0.2.

4,927,744

PHOTOGRAPHIC ELEMENT HAVING SOLID PARTICLE DISPERSION OXIDIZED DEVELOPER SCAVENGER

Richard P. Henzel, Webster, and Paul L. Zengerle, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 5, 1988, Ser. No. 229,372
Int. Cl.[5] G03C *1/42*
U.S. Cl. 430—566 **11 Claims**

1. A photographic element comprising a support having thereon at least one silver halide emulsion layer, and a layer, which is the same or different from the silver halide layer, comprising solid particles dispersed in a vehicle, said particles consisting essentially of a hydroquinone derivative.

4,927,745

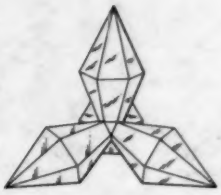
SILVER HALIDE GRAINS AND PROCESS FOR THEIR PREPARATION

Mark E. Irving, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 22, 1989, Ser. No. 369,789
Int. Cl.[5] G03C *1/02*
U.S. Cl. 430—567 **12 Claims**

1. A process for the preparation of radiation sensitive silver halide grains which have the morphological configuration of four hexagonal bipyramids, the four bases of which are joined to form a common tetrahedron which process comprises the steps of:

(a) forming in a colloid dispersing medium silver halide grains containing at least 90 mol % iodide by homogeneous nucleation of silver iodide grains at a pAg of from about 11.0 to about 5.0 at a temperature between about 30° and 90° C.;



(b) maintaining these conditions until the silver iodide grains are from about 0.005 to about 0.5 μm in diameter;

(c) altering the growth environment of the silver iodide grains to a pAg of from about 13.5 to about 9.8 at a temperature from about 30° to about 90° C., and optionally;

(d) removing water soluble salts formed during the precipitation.

4,927,746

PHOTOGRAPHIC STABILIZING BATH CONTAINING POLYARCYLIC ACID

Paul A. Schwartz, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 3, 1988, Ser. No. 202,728
Int. Cl.[5] G03C *7/40*
U.S. Cl. 430—372 **20 Claims**

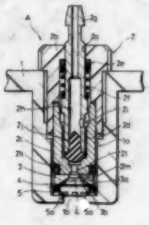
1. An aqueous photographic stabilizing bath for use in the color processing of photographic elements, said bath containing a dye stabilizing agent, an alkanolamine in an amount sufficient to inhibit sulfurization of said stabilizing bath resulting from carry-in of a thiosulfate fixing agent, and polyacrylic acid or a water-soluble salt thereof in an amount sufficient to prevent the precipitation of calcium salts.

4,927,747

NONCONTROLLING TYPE VALVE

Tomio Nitta, Yokohama, Japan, assignor to Tokai Corp., Yokohama, Japan

Filed Apr. 24, 1989, Ser. No. 342,201
Claims priority, application Japan, Apr. 27, 1988, 63-55865[U]
Int. Cl.[5] F23D *14/28*; F23Q *2/16*
U.S. Cl. 431—344 **1 Claim**



1. A noncontrolling type valve for a gas container having a top plate, a recess formed in said top plate, said recess having

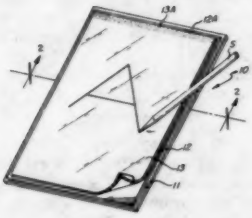
a through aperture in its bottom communicating with the inside of said gas container comprising; a valve body having a valve opening at one end push-fitted in said recess with said valve opening facing said through opening in said bottom of said recess; and a filter positioned in said recess under said valve body for permitting a given constant flow of gas to pass to said valve body when said valve opens, characterized in that said filter is a porous object having a center aperture and a downward-diverging space, said porous object being in said recess between a bottom end of said valve body and said bottom of said recess with said center aperture in alignment with said valve opening of said valve body, said valve further comprises; a slotted ring push-fitted in said recess in advance of said valve body and said porous object and across said through aperture in said bottom of said recess; an impermeable, resilient membrane on said slotted ring, said porous object engaging said membrane; and an O-ring fitted around said one end of said valve body and pushing against an inside edge of an uppersurface of said porous object and against an inner wall of said recess for preventing gas from leaking sideways past said O-ring.

4,927,748

LUMINESCENT WRITING OR DISPLAY DEVICE

Benjamin Kinberg, 200 Fifth Ave., New York, N.Y. 10010

Filed Feb. 27, 1989, Ser. No. 315,611
Int. Cl.[5] B43L *1/12*
U.S. Cl. 434—410 **5 Claims**



1. An improved writing and display device for producing a luminescent image upon the application of a pressure thereon comprising

a transparent plastic sheet having means comprising a primary low volatile plasticizer, and containing a luminescent tinting material integrally dispersed throughout said plastic sheet,

an opaque white sheet disposed contiguous to said transparent sheet to be in direct interfacing relationship therewith,

said transparent sheet and tinting materials therein being in overlying relationship and in direct contacting relationship to said opaque sheet,

and said sheets each having an exposed smooth surface for direct contact at the inteface thereof,

said means being capable of prohibiting the migration of said tinting material from said transparent sheet and onto said underlying opaque sheet in direct contact therewith,

and at least one of said sheets being pliable so that upon the application of pressure thereon, the respective smooth surfaces of said sheets are urged into intimate contact at the points of the applied pressure to form a luminescent image along the points of applied pressure that will be retained so long as said sheets are adhered to one another along the points of applied pressure,

whereby any protective insert between said transparent and opaque sheet during non-use of said display device is rendered unnecessary.

4,927,749

REAGENT FOR CELL SEPARATION

Allan R. Dorn, Bethany, Okla., assignor to Jeanette Simpson, Tulsa, Okla.

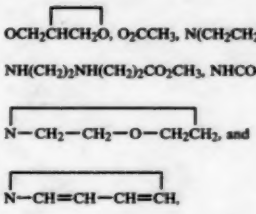
Filed Apr. 9, 1986, Ser. No. 849,819
Int. Cl.[5] A01N *1/02*; C12N *1/02*
U.S. Cl. 435—2 **11 Claims**

1. A cell separation composition comprising a stable aqueous colloidal suspension of reagent-modified colloidal silica particles, which suspension is comprised of a plurality of colloidal silica particles, each particle covalently linked to an organosilane having a non-ionic, hydrophilic group.

2. The composition of claim 1 wherein said organosilane is of the general formula:

$$(X)_3—Si—(CH_2)_3—Y$$

and wherein "Y" is selected from the group consisting of



and wherein "X" is selected from the group consisting of H_3CO, Cl, H_5C_2O, H_3CCO_2, and H_3C.

4,927,750

CELL SEPARATION PROCESS

Allan R. Dorn, Bethany, Okla., assignor to Jeanette Simpson, Tulsa, Okla.

PCT No. PCT/US87/00628, § 371 Date Mar. 25, 1987, § 102(e) Date Mar. 25, 1987, PCT Pub. No. WO87/06233, PCT Pub. Date Oct. 22, 1987
Continuation-in-part of Ser. No. 849,819, Apr. 9, 1986. This PCT application Mar. 25, 1987, Ser. No. 49,863
Int. Cl.[5] A01N *1/02*; C12N *1/02*
U.S. Cl. 435—2 **11 Claims**

1. A process for separating a component of interest from a cell mixture, comprising the steps of:

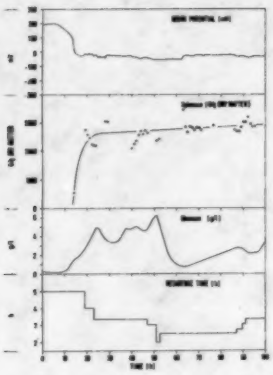
(a) adding a cell mixture to a cell separation composition to form a composite, said cell separation composition comprising a plurality of colloidal silica particles covalently linked to an organosilane reagent having a non-ionic hydrophilic group, said cell separation composition diluted with an appropriate aqueous solution to a buoyant density near the range of the buoyant density of a component of interest in said cell mixture; and

(b) centrifuging said component at a sufficient speed for a sufficient duration to generate a density gradient in situ so that said component of interest separates from other components in said cell mixture, with the proviso that said sufficient speed and sufficient duration are low enough to preserve the viability of the component of interest.

4,927,751
PROCESSES FOR OBTAINING EXOENZYMES BY CULTURE

Klaus Memmert, and Christian Wandrey, both of Jülich, Fed. Rep. of Germany, assignors to Kernforschungsanlage Juelich Gesellschaft mit beschraenkter Hagtung, Juelich, Fed. Rep. of Germany

Filed Jul. 7, 1986, Ser. No. 882,349
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3524273; Apr. 19, 1986, 3613311
Int. Cl.[5] C12Q 3/00; C12N 9/00, 9/28, 9/56
U.S. Cl. 435—3 41 Claims



1. A process for obtaining exoenzymes by continuous-flow fermentation, comprising the steps of

(A) providing a culture of an exoenzyme-producing microorganism in one fermenter which provides an output solution;

(B) imposing on said culture in said fermenter a continuous modification of growth conditions under non chemastatic conditions, wherein said continuous modification is predetermined to effect a restricted multiplication of said microorganism, such that a maximum exoenzyme production by said culture is repeatedly obtained;

(C) continuing said modification of growth conditions to maximize exoenzyme production; and then

(D) recovering exoenzyme from said output solution from said fermenter.

24. A process for obtaining exoenzymes by continuous-flow fermentation performed in only one fermenter, comprising the steps of

(A) providing a culture of an exoenzyme-producing microorganism in one fermenter which provides an output solution;

(B) imposing on said culture a transient modification of growth conditions in said fermenter, wherein said modification effects a restricted multiplication of said microorganism, such that a maximum exoenzyme production by said culture is repeatedly obtained, and wherein (1) said modification of growth conditions is imposed each time the exoenzyme concentration in said culture decreases to less than 50% of a preceding maximum value and (2) said restricted multiplication results in a biomass decrease, in said culture, of more than 30%;

(C) repeating said modification of growth conditions to achieve said maximum exoenzyme production; and then

(D) recovering exoenzyme from said output solution from said fermenter.

4,927,752
SUPPORT USED IN BIOLUMINESCENT DOSING OF ENZYMES, SUBSTRATES OR ENZYMATIC INHIBITORS

José Remacle, Chemin des Pierres 14, B-5730 Malonne, Belgium

PCT No. PCT/BE86/00020, § 371 Date Feb. 20, 1987, § 102(e) Date Feb. 20, 1987, PCT Pub. No. WO87/00198, PCT Pub. Date Jan. 15, 1987
PCT Filed Jun. 19, 1986, Ser. No. 31,470
Claims priority, application Belgium, Jun. 26, 1985, 902745
Int. Cl.[5] C12N 11/08; C12Q 1/66; G01N 33/53
U.S. Cl. 435—8 34 Claims

17. A method for determining a test enzyme in a test solution, comprising:

contacting an immobilized enzyme device with a test solution,

said immobilized enzyme device comprises:

a transparent hydrophobic plastic support;

a layer of an amino acid polymer coating the support, said amino acid polymer having hydrophobic portions and hydrophilic portions and said amino acid polymer being oriented so that the hydrophobic portions of the polymer are bound to the support and the hydrophilic portions of the polymer extend outwardly from the support; and

an enzyme composition adsorbed to the hydrophilic portions of the polymer, said composition comprising a luciferase; and

said test solution comprising:

the test enzyme and chemical species that enzymatically react with the test enzyme and the luciferase to emit photons;

detecting photoemission from the contacted test solution; and

quantifying the photoemission to determine the test enzyme in the test solution.

4,927,753
QUANTITATIVE DETERMINATION OF L-FUCOSE

Takeshi Sakai; Susumu Matsui, both of Shiga; Sumiko Akiyoshi, Kyoto, and Akira Obayashi, Uji, all of Japan, assignors to Takara Shuzo Co., Ltd., Kyoto, Japan

Filed Jan. 14, 1987, Ser. No. 3,283
Claims priority, application Japan, Jan. 29, 1986, 61-17435
Int. Cl.[5] C12Q 1/32, 1/34; C12N 9/04; C12R 1/15
U.S. Cl. 435—26 5 Claims

1. A method for the quantitative determination of L-fucose in a sample solution, which comprises allowing an L-fucose dehydrogenase derived from Corynebacterium sp. FS-0077 (FERM BP 1234) and having its optimum pH around neutrality to act upon said sample solution in the presence or absence of an α-L-fucosidase, measuring the amount of reduced nicotinamide adenine dinucleotide thus formed and relating the amount of reduced nicotinamide adenine dinucleotide measured to the amount of L-fucose in the sample.

4,927,754
METHOD FOR SELECTIVELY INCREASING THE RATIO OF SINGLE MAJOR COMPONENTS OF TEICOPLANIN A2 COMPLEX

Francesco Asti, Cernusco Sul Naviglio; Giancarlo Lancini, Pavia, and Anacleto Gianantonio, Milan, all of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Filed May 19, 1986, Ser. No. 864,675
Claims priority, application United Kingdom, May 21, 1985, 8512795
Int. Cl.[5] C12P 19/56, 21/04; C12N 1/38
U.S. Cl. 435—71 49 Claims

1. A process for preparing teicoplanin A_2 (T-A2) selectively enriched in one of its major components, wherein said component is T-A2-1, which comprises adding to the culture medium

of *Actinoplanes teichomyceticus* nov. sp. ATCC 31121, or one of its mutant which produces T-A2-1 through the same metabolic pathway, an effective amount of an appropriate precursor of the acyl group of the glucosamine moiety of T-A-2-1, wherein said appropriate precursor is selected from the group consisting of:

linoleic acid, its salts with bases which are non-toxic to the microorganism and its esters with mono- and polyhydroxy lower alkanols.

4,927,755

PROCESS FOR PREPARING POLYNUCLEOTIDES

Chabrier De Lassauniere, Paris, and Acaye S. Colote, Les Ulis, both of France, assignors to Societe de Conseils de Recherches et d'Applicatios Scientifiques (S.C.R.A.S.), France

Filed Nov. 1, 1988, Ser. No. 265,561

Claims priority, application United Kingdom, Nov. 2, 1987, 8725606

Int. Cl.[5] C12P *19/34;* **C07K** *3/12, 3/18, 3/20*

U.S. Cl. 435—91 **2 Claims**

1. A process for preparing polymers of nucleotides comprising the following sequence of steps:

inducing the lysis of a bacteria strain culture and passing the resulting medium successively through three columns:

the first one containing an ion exchange resin,

the second one containing a hydrophobic resin and

the third one containing a molecular sieve, which treatment leads to a polynucleotidephosphorylase solution substantially pure with regard to substances that might affect a further polymerisation process,

treating a selected nucleotide by the phosphorylase thus obtained, comprising reacting from about 200 to about 750 phosphorylase units in a solution containing the usual buffers and a concentration of 0.06 to 0.2 mmoles/ml of the selected mononucleotide in the presence of $MgCL_2$, stepwise added for controlling the polymerisation level, for a duration of about 3 to about 6 while keeping the pH values between 7.4 and 8.6,

separating and washing the polymer thus obtained, whereby a substantially non-pyrogenic and/or substantially non-toxic polymer is obtained.

4,927,756

WATER SOLUBLE IRON DEXTRAN AND A PROCESS FOR ITS MANUFACTURE

Dieter Schwengers, Dormagen, Fed. Rep. of Germany, assignor to Pfeifer & Langen, Cologne, Fed. Rep. of Germany

Division of Ser. No. 741,395, Jun. 5, 1985, Pat. No. 4,749,695. This application Feb. 25, 1988, Ser. No. 159,146

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1984, 3422249

Int. Cl.[5] C12P *19/08, 19/18;* **C08B** *37/02;* **C07G** *17/001*

U.S. Cl. 435—103 **17 Claims**

1. A process for the manufacture of water soluble iron dextran having an iron content of from 27 to 33 percent by weight and an average molar mass of the dextran component of from 2000 to 4000, characterized by adding to an aqueous solution containing more than 200 mmol D-glucose per 1000 Uα(1→6)-D-glucosyl transferase, at from 265 to 310 K. and a pH value of from 4.5 to 8, an aqueous sucrose solution in such an amount that the mole ratio of sucrose to glucose is from 2.0 to 5.0; separating, after the consumption of the sucrose, liberated fructose and undesirable oligosaccharides; reacting the so-purified dextran with freshly precipitated iron(III) hydroxide and optionaly further purifying the same.

4,927,757

PRODUCTION OF SUBSTANTIALLY PURE FRUCTOSE

Herbert J. Hatcher, Idaho Falls; John J. Gallian, Twin Falls, and Stephen A. Leeper, Idaho Falls, all of Id., assignors to Idaho Research Foundation, Inc., Moscow, Id.

Filed Jul. 29, 1988, Ser. No. 225,914

Int. Cl.[5] C12P *19/02, 19/24, 19/18;* **C12N** *11/18*

U.S. Cl. 435—105 **15 Claims**

1. A process for the production of a substantially pure product containing greater than 60% fructose, comprising:

combining a sucrose-containing substrate with effective amounts of a levansucrase enzyme preparation to form levan and glucose;

purifying said levan by at least one of the following purification methods: ultrafiltration, diafiltration, hyperfiltration, reverse osmosis, liquid-liquid partition, solvent extraction, chromatography, and precipitation;

hydrolyzing said levan to form fructose substantially free of glucose and sucrose; and,

recovering said fructose by at least one of the following recovery methods: hyperfiltration, reverse osmosis, evaporation, drying, crystallization, and chromatography.

4,927,758

PROCESS FOR PRODUCING HISTIDINE

Toru Mizukami; Ryoichi Katsumata, both of Machida, and Tetsuo Oka, Yokohama, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 580,814, Feb. 16, 1984. This application Aug. 25, 1987, Ser. No. 89,922

Claims priority, application Japan, Feb. 17, 1983, 58-25397

Int. Cl.[5] C12R *13/24;* **C12N** *1/20;* **C12P** *1/13, 1/15*

U.S. Cl. 435—107 **9 Claims**

1. A process for producing histidine, which comprises:

transforming a host microorganism belonging to the genus Corynebacterium or Brevibacterium with a vector containing a DNA fragment containing a gene isolated from *Corynebacterium glutamicum* or *Escherichia coli* coding for ATP phosphoribosyl transferase; culturing the transformant in a nutrient medium; accumulating histidine in the culture medium; and recovering histidine therefrom.

4,927,759

NEW STRAINS OF *PSEUDOMONAS PUTIDA* AND THEIR USE

John A. Schofield; Peter R. Betteridge; George Ryback, all of Sittingbourne, and Philip J. Geary, Ashford, all of England, assignors to Shell Oil Company, Houston, Tex.

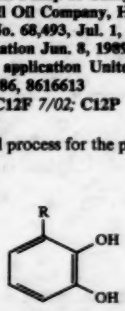
Division of Ser. No. 68,493, Jul. 1, 1987, Pat. No. 4,876,200. This application Jun. 8, 1989, Ser. No. 363,575

Claims priority, application United Kingdom, Jul. 8, 1986, 8616612; Jul. 8, 1986, 8616613

Int. Cl.[5] C12F *7/02;* **C12P** *7/22;* **C12R** *1/40*

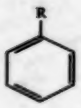
U.S. Cl. 435—156 **4 Claims**

1. A biochemical process for the preparation of a compound of formula (III)



(III)

from a compound of formula (I)



(I)

wherein R is hydrogen or fluorine, comprising providing a culture of a strain of *Pseudomonas putida* NCIB 12190 or mutant thereof, which is constitutive for and which accumulates catechol or 3-fluorocatechol, supplying a compound of formula (I) to the culture in a suitable medium in the absence of an inducing agent for said strain and subsequently recovering a compound of formula (III) therefrom.

4,927,760

PRODUCTION OF CRYSTALLINE PIGMENTS FROM MONASCUS DURING FERMENTATION

Edward J. St. Martin, Libertyville, Ill., assignor to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 261,811, Oct. 24, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 366,726

Int. Cl.[5] C12P *1/02, 7/48;* C12N *9/02, 9/06*

U.S. Cl. 435—171 6 Claims

1. A process of inducing crystalline precursor pigment formation from Monascus species producing the precursor pigment in a pigment producing culture medium at a level of at least 30 milligrams per liter comprising growing said Monascus species in a pigment producing culture medium containing a crystalline pigment inducer in an amount effective to induce crystalline pigment formation.

4,927,761

IMMOBILIZATION OF CELLS WITH ALGINATE AND AGAROSE

Anthony H. Reading, Wantage, and Brynley J. Miles, Cirencester, both of United Kingdom, assignors to The Secretary of State for United Kingdom Atomic Energy Authority in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Mar. 1, 1988, Ser. No. 162,579

Claims priority, application United Kingdom, Mar. 9, 1987, 8705464

Int. Cl.[5] C12N *11/10, 11/02, 5/02*

U.S. Cl. 435—178 5 Claims

1. A method for preparing a composite material containing immobilized viable biological cells, said method comprising forming a mixture consisting essentially of viable biological cells, alginate and agarose; forming droplets of said mixture; contacting said droplets with a reagent to gel the alginate to thereby provide a stable matrix within which the agarose is held until set, said matrix containing said viable biological cells; and subsequently removing at least a portion of said alignate to form a composite material comprising beads of porous agarose gel in which said viable biological cells are immobilized.

4,927,762

CELL CULTURE MEDIUM WITH ANTIOXIDANT

Frederick J. Darfler, Derwood, Md., assignor to Cell Enterprises, Inc., Harrisonburg, Va.

Continuation of Ser. No. 846,716, Apr. 1, 1986, abandoned. This application Nov. 30, 1988, Ser. No. 281,974

Int. Cl.[5] C12N *5/00, 5/02, 1/38*

U.S. Cl. 435—240.31 26 Claims

1. A chemically defined, serum free, albumin-free medium for maintenance or growth of immortal or immortalized cells which comprises a cell-growth promoting amount of a compound having one free thiol group, and which is capable of supporting the growth of immortal or immortalized cells at seed densities less than 10^5 cells/ml.

4,927,763

STABILIZATION OF DRIED BACTERIA EXTENDED IN PARTICULATE CARRIERS

A. Louis Sudoma, and Dean G. Dalebroux, both of Milwaukee, Wis., assignors to Chr. Hansen's Laboratory, Inc., Milwaukee, Wis.

Continuation of Ser. No. 591,944, Mar. 21, 1984, abandoned. This application Jun. 28, 1988, Ser. No. 212,515

Int. Cl.[5] C12N *91/04, 1/20;* C12R *1/01*

U.S. Cl. 435—260 9 Claims

1. The method of forming stabilized admixtures of dried viable harmless lactic acid producing bacteria, comprising:

(a) preparing a blend by intermixing a non-toxic particulate carrier with a hydrophilic molecular sieve absorbent, said blend containing at least about 95% by weight of said carrier which carrier has a water absorbing capacity of less than one percent of its moisture free weight when equilibrated in air of 70% relative humidity, said molecular sieve absorbent having a water absorbing capacity of at least 15% of its moisture free weight when equilibrated in air at 10% relative humidity and being blended in 0.1 to 2 parts by weight per each 98 to 99.9 parts of said carrier; and

(b) dispersing in said blend either during the intermixing of step (*a*) or subsequent thereto said lactic acid product bacteria to form a highly diluted admixture thereof which is storable without refrigeration.

4,927,764

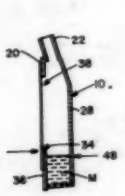
TISSUE CULTURE FLASK

George Lyman, Cape Porpoise, and Gregory Mathus, Concord, both of Mass., assignors to Costar Corporation, Cambridge, Mass.

Filed Nov. 17, 1987, Ser. No. 122,052

Int. Cl.[5] B01L *3/08;* C12M *1/24*

U.S. Cl. 435—296 15 Claims



14. A tissue culture flask comprising rigid plastic top and bottom walls connected together by sides, an open neck adapted to receive a removable cover connected to one of the sides said bottom wall having an inner surface for growing tissue cultures,

an opening in the top wall opposite the inner surface of the bottom wall for access to said surface,

and a cover secured to the top wall for closing the opening, said cover overlapping said top wall at a portion of said top wall.

4,927,765

AUTOMATIC REAGENT DISPENSER

Ronald L. Saxon, Port Murray; Leroy Zeger, Passaic, and Kenneth Horbatt, Pompton Plains, all of N.J., assignors to Pharmacia ENI Diagnostics, Inc., Fairfield, N.J.

Filed Feb. 29, 1988, Ser. No. 162,172

Int. Cl.[5] G01N *35/00*

U.S. Cl. 436—43 6 Claims

1. A method for automatically dispensing one or more rea-

gents into one or more cuvettes which avoids contamination of said reagents comprising the steps of:

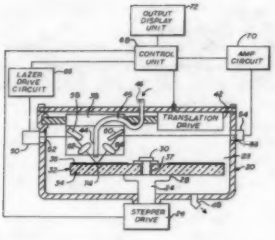
(1) moving an aspirating arm to a selected reagent bottle,
(2) engaging a pipette tip which is supported by the cap of the reagent bottle,
(3) aspirating a preselected volume of reagent,
(4) elevating the aspirating arm so that the tip is clear of the bottle and its cap,
(5) moving the aspirating arm to a selected cuvette so that the tip does not pass over another reagent bottle or a non-selected cuvette,
(6) expelling the aspirated reagent into the cuvette,
(7) moving the aspirating arm so that the tip is repositioned over the original bottle,
(8) releasing the tip into the cap of the bottle and
(9) moving the aspirating arm to the next reagent bottle.

4,927,766

GAS CONSTITUENT MEASUREMENT AND RECORDING

Abraham Auerbach, Monsey, N.Y., and Sonia Friedman, Lawrenceville, N.J., assignors to The BOC Group, Inc., Murray Hill, New Providence, N.J.

Filed May 27, 1986, Ser. No. 866,810
Int. Cl.[5] G01N *31/22, 35/00*
U.S. Cl. 436—44 **55 Claims**



1. A method of measuring the molecular concentration of a constituent in a gas comprising the steps of:

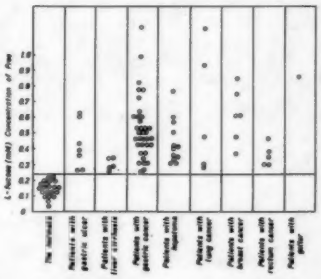
(a) contacting the gas with a surface of a solid body;
(b) momentarily heating said surface so that said constituent reacts at said surface to alter a property of said surface permanently; and
(c) determining the degree or rate of alteration in said property produced by reaction of said constituent during said momentary heating step, said heating step including the step of momentarily applying heating radiant energy to said surface in a plurality of heating pulses to a plurality of different localized regions of said surface in temporal sequence, said determining step being performed separately for each of said localized regions to thereby provide a plurality of measurements of said molecular concentration, whereby each of said measurements is indicative of said molecular concentration at the time of one of said pulses.

4,927,767

METHOD FOR THE DETECTION OF DISEASES ASSOCIATED WITH THE METABOLIC ABNORMALITY OF L-FUCOSE

Takeshi Sakai, Kusatsu; Hiroko Yokota, Otsu; Kazuki Yamamoto, Moriyama; Sadaji Yokoyama; Susumu Matsui, both of Otsu; Ikunoshin Kato, and Akira Obayashi, both of Uji, all of Japan, assignors to Takara Shuzo Co., Ltd., Kyoto, Japan

Filed Oct. 20, 1988, Ser. No. 260,518
Claims priority, application Japan, Nov. 19, 1987, 62-290735; May 10, 1988, 63-111576
Int. Cl.[5] G01N *33/493, 33/50*
U.S. Cl. 436—64 **2 Claims**



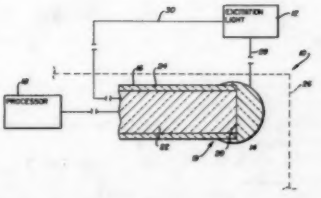
1. A method for the detection of a disease associated with the metabolic abnormality of L-fucose in a subject, which comprises determining the concentration of free L-fucose in a urine specimen from the subject, and comparing the determined concentration with a normal concentration of free L-fucose.

4,927,768

GROWN CRYSTALLINE SENSOR AND METHOD FOR SENSING

Peter K. Coughlin, Yorktown Heights, N.Y.; William C. Mercer, Brookfield, Conn., and Edith M. Flanigen, White Plains, N.Y., assignors to UOP, Des Plaines, Ill.

Filed Jun. 29, 1988, Ser. No. 213,302
Int. Cl.[5] G01N *21/00*
U.S. Cl. 436—172 **64 Claims**



1. A sensor for determining the concentration of a gaseous component of interest comprising a sensing element comprising an inorganic oxide composition and an inorganic crystalline composition including at least one metal component in an amount effective to provide a light signal at least one property of which varies as the concentration of the gaseous component of interest varies, said inorganic crystalline composition having been grown, or derived from a material grown, by crystal growth upon at least a portion of the surface of said inorganic oxide composition to form a composite with at least two substantially contiguous phases which exhibit at least one of a

distinct compositional heterogeneity and a distinct structural heterogeneity of one phase to the other; and processing means to process said signal and provide a basis for determining the concentration of said gaseous component of interest.

4,927,769

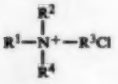
METHOD FOR ENHANCEMENT OF CHEMILUMINESCENCE

Steve C. S. Chang, Franklin, and Thomas E. Miller, Norwood, both of Mass., assignors to Ciba Corning Diagnostics Corp., Medfield, Mass.

Filed Jul. 8, 1987, Ser. No. 71,660
Int. Cl.[5] G01N *33/543, 21/00, 33/531, 33/532*
U.S. Cl. 436—518 **13 Claims**

1. A method for enhancing the chemiluminescent signal of an acridinium ester in a chemiluminescent reaction which comprises oxidizing the acridinium ester in the presence of an effective amount of an enhancer to effect enhanced chemiluminescent signal said enhancer selected from the group consisting of:

(a) a quarternary amine cationic surfactant of formula:



wherein R^1 is C_8–C_{20} alkyl or alkenyl; and R^2, R^3 and R^4 are C_1–C_4 alkyl or alkenyl.

(b) a nonionic surfactant; and

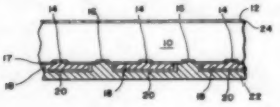
(c) a sulfated primary alcohol selected from the group consisting of sodium dodecylsulfate, magnesium dodecylsulfate and tridecylsulfate.

4,927,770

METHOD OF FABRICATING BACK SURFACE POINT CONTACT SOLAR CELLS

Richard M. Swanson, Los Altos, Calif., assignor to Electric Power Research Inst. Corp. of District of Columbia, Palo Alto and Board of Trustees of the Leland Stanford California Corporation, Stanford, both of, Calif.

Filed Nov. 14, 1988, Ser. No. 272,130
Int. Cl.[5] H01L *31/18*
U.S. Cl. 437—2 **14 Claims**



1. A method of fabricating a back surface point contact solar cell, comprising the steps of

(a) providing a substrate of silicon having two major opposing surfaces,

(b) forming a silicon oxide layer on at least a first of said major surfaces,

(c) forming a silicon nitride layer on said silicon oxide layer,

(d) removing first portions of said layers thereby exposing first surface areas on said first major surface,

(e) forming a first doped layer with a first conductivity type dopant therein on said surface areas,

(f) removing second portions of said layers, thereby exposing second surface areas on said first major surface,

(g) forming a second doped layer with a second conductivity type dopant therein over on said second surface areas,

(h) heating said substrate and thereby diffusing dopant from said first layer into said first surface areas and diffusing dopant from said second doped layer into said second surface areas,

(i) subjecting said substrate and said layers to an elevated temperature of at least 900° C. in a hydrogen atmosphere, thereby hydrogenating the interface between said major surface and said silicon oxide layer,

(j) removing said first and second doped layers by a preferential etchant which does not remove said silicon nitride, and

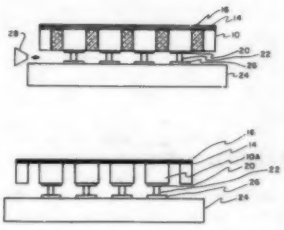
(k) forming a two-level metal interconnect structure for separately contacting said first surface areas and said second surface areas.

4,927,771

METHOD OF THERMAL ISOLATION OF DETECTOR ELEMENTS IN AN UNCOOLED STARING FOCAL PLANE ARRAY

Donald A. Ferrett, Prince William Co., Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 7, 1989, Ser. No. 319,788
Int. Cl.[5] H01L *27/144*
U.S. Cl. 437—3 **7 Claims**



1. A method of thermally isolating detector elements in an uncooled staring focal plane array, said method comprising the steps of:

providing an unthinned wafer of detector material;

reticulating said wafer to form reticulated grooves and isolated detector elements;

backfilling said reticulated grooves by evaporating arsenic trisulfide as removable backfill material therein until said reticulated grooves are filled to overflow to strengthen the reticulated wafer;

cleaning excess backfill material down to the top of said detector elements;

evaporating a top electrode layer over the surface formed by said backfill material and said top of said detector elements;

evaporating an absorber layer over said top electrode layer;

inverting said unthinned wafer of detector material and mounting on a layer of support material;

thinning said unthinned wafer to a final thickness wherein said backfill material is exposed forming isolated detector elements;

depositing a metal pad and solder bump sequentially on each of said isolated detector elements wherein the temperature of deposition never exceeds 170 degrees Celsius to prevent thermal sublimation of said arsenic trisulfide removable backfill material;

bump bonding a readout device to each of said solder bumps;

inverting said readout device and the thinned wafer and removing said layer of support material from said absorber layer; and

jetting an oxygen rich gas between the detector array and said readout device in the open space formed around the bump bonds to remove said arsenic trisulfide removable backfill material from said reticulated grooves wherein said bonded detector array and readout device are fixed on a rotating stage in an enclosure and a nozzle jetting said oxygen rich gas is stationary so that said gas is jetted

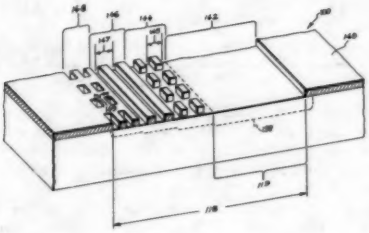
through the open space from all directions as the array and device are rotated wherein said oxygen rich gas sublimates and carries away the arsenic trisulfide out of said reticulated grooves to leave thermal isolation air gaps between said detector elements.

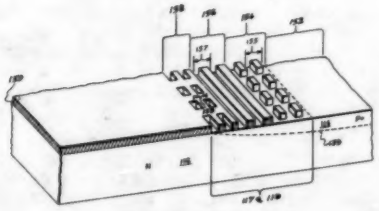
4,927,772

METHOD OF MAKING HIGH BREAKDOWN VOLTAGE SEMICONDUCTOR DEVICE

Stephen D. Arthur, Scotia, and Victor A. K. Temple, Jonesville, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 30, 1989, Ser. No. 358,057
Int. Cl.[5] H01L *21/26*
U.S. Cl. 437—6 **13 Claims**





1. A process of fabricating a semiconductor device including, when complete, at least one P-N junction, a first region of semiconductor material of one conductivity type having an upper surface and forming one side of said junction, a second region of semiconductor material having a lower surface and forming the other side of said junction, said second region being formed within said first region with conductivity type opposite that of the first region; and wherein said P-N junction includes a terminated portion at said upper surface of said first region, said second region includes a graded region adjacent to termination of said P-N junction, and said first region at a location beneath said P-N junction contains a depletion region width W_D when said junction is reverse-biased to its ideal breakdown voltage, the improvement comprising, in combination with the foregoing:

(a) forming a first mask of not so uniform thickness on said semiconductor device adjacent to said terminated portion to be used in forming a junction termination extension region, said step of forming a first mask comprising configuring said mask to expose a percentage x of a first portion of said first region adjacent said terminated portion and to expose a percentage y of a second portion of said first region adjacent said first portion remote from said terminated portion of said P-N junction, and wherein x is greater than y and adjacent openings in said first mask have a center-to center spacing of less than $0.25W_D$;

(b) simultaneously doping said first and second portions of said first region through said first mask with the same concentration of dopant to form in said first region, a first zone contiguous with said terminated portion and a second zone adjacent said first zone, said first and second zones being of approximately the same depth and establishing a junction termination extension;

(c) forming a second mask of not so uniform thickness on said semiconductor device adjacent said terminated portion and remote from the balance of said junction termination extension region, to be used in forming said second region including said graded region, said step of forming a second mask comprising configuring said mask to expose a percentage m of a first portion of said first region adjacent said terminated portion and to expose a percentage n of a second portion of said first region adjacent said first portion remote from said terminated portion of said P-N junction and wherein n is greater than m;

(d) simultaneously doping said first and second portions of said first region through said second mask with the same concentration of dopant to form in said first region said second region such that said second region has a first zone contiguous with said terminated portion and a second zone adjacent said first zone; and

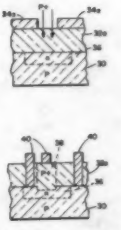
(e) simultaneously diffusing said junction termination extension implant and said second region dopant implant, whereby the junction termination extension region is diffused with no additional diffusion time other than that required for diffusion of the P-N junction.

4,927,773

METHOD OF MINIMIZING IMPLANT-RELATED DAMAGE TO A GROUP II-VI SEMICONDUCTOR MATERIAL

Michael D. Jack, Goleta; George R. Chapman, Santa Barbara, and Michael Ray, Goleta, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Jun. 5, 1989, Ser. No. 361,452
Int. Cl.[5] H01L *21/385, 21/425*
U.S. Cl. 437—22 **29 Claims**



1. In a semiconductor material comprised of Group II–VI material, a method of forming a region therein that differs from the semiconductor material surrounding the region, comprising the steps of:

providing a body comprised of Group II–VI semiconductor material;

forming a cap layer having a lower surface that overlies a surface of the body;

implanting a selected chemical species through an upper surface of the cap layer, the species being implanted to a depth such that an implant peak is located within the cap layer such that no significant implant damage or effects thereof are sustained by the underlying body; and

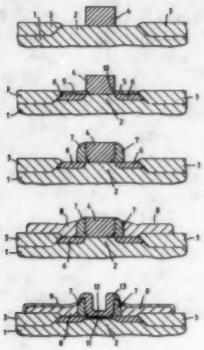
diffusing the implanted species from the cap layer down into the underlying body to form a region therein that differs from the material of the body surrounding the region.

4,927,774

SELF ALIGNED BIPOLAR FABRICATION PROCESS

Anthony Welbourn, Ipswich, and Christopher Heslop, Woodbridge, both of England, assignors to British Telecommunications plc, London, England

Continuation of Ser. No. 204,823, Jun. 10, 1988, abandoned.
This application Oct. 18, 1989, Ser. No. 423,691
Int. Cl.[5] H01L 21/34
U.S. Cl. 437—31 12 Claims



1. A method of fabricating a walled-emitter transistor, the method comprising the steps of:

(a) forming an isolated device island (2) on the surface of a semiconductor wafer (1);

(b) forming a first layer (3) of dielectric material on the surface of the semiconductor wafer (1), the first layer (3) of dielectric material having an opening exposing at least part of the device island (2);

(c) forming a body (4) of dielectric material within said opening to leave exposed an annulus of the device island (2);

(d) oxidising the surface of said exposed annulus to produce a layer (5) of oxide which extends beneath the periphery of the body (4) of dielectric material;

(e) forming non-lithographically, within said opening, an annular body (7) of dielectric material against and about the body (4) of dielectric material;

(f) forming a base contact conductor (8) about the annular body (7) of dielectric material and in contact with the semiconductor of the device island (2);

(g) forming a second layer (9) of dielectric material on the base contact conductor (8);

(h) removing the body (4) of dielectric material to expose the substrate within the inner periphery of the annular body (7) of dielectric material, and forming a base region (11) within the semiconductor so exposed; and

(i) forming an emitter (12) in the semiconductor exposed within the inner periphery of the annular body (7) of dielectric material.

4,927,775

METHOD OF FABRICATING A HIGH PERFORMANCE BIPOLAR AND MOS DEVICE

Antonio R. Alvarez, Sunnyvale, Calif., and James A. Kirchgessner, Mesa, Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Mar. 6, 1989, Ser. No. 319,387
Int. Cl.[5] H01L 21/28, 21/22
U.S. Cl. 437—31 3 Claims

1. A method of fabricating a bipolar device integrated with an MOS device, comprising the steps of:

providing a semiconductor substrate having at least a first and a second isolated region;

forming a gate dielectric layer over the first isolated region;

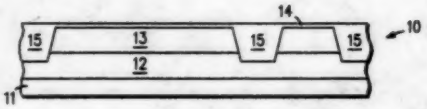
forming an intrinsic base region in the second isolated region;

depositing a polysilicon layer on the surface of the substrate;

doping a predetermined region of the polysilicon layer which defines a polysilicon emitter region and a polysilicon gate region;

removing portions of the polysilicon layer adjacent to the polysilicon emitter region and adjacent to the polysilicon gate region;

forming a source and a drain region in the substrate adjacent to the polysilicon gate region;



growing a silicon dioxide layer on the surface of the polysilicon layer and the semiconductor substrate surfacer, wherein a thicker amount of silicon dioxide grows over the polysilicon emitter region and the polysilicon gate region;

etching the silicon dioxide layer so that only a portion of the silicon dioxide which is adjacent to the polysilicon gate region and the polysilicon emitter region remains, thereby creating silicon dioxide sidewall spacers; and

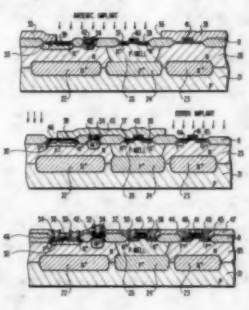
forming a silicide layer on the polysilicon layer, the polysilicon emitter region, and the semiconductor substrate surface, wherein the silicide forms self-aligned contacts to the intrinsic base regions, the polysilicon emitter region, the source and drain regions, and the polysilicon gate region.

4,927,776

METHOD OF PRODUCING SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE INCLUDING BIPOLAR TRANSISTOR AND INSULATED GATE FIELD EFFECT TRANSISTOR

Katsumoto Soejima, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 920,009, Oct. 17, 1986, abandoned.
This application Nov. 8, 1988, Ser. No. 270,434
Claims priority, application Japan, Oct. 17, 1985, 60-232671
Int. Cl.[5] H01L 21/265
U.S. Cl. 437—33 6 Claims



1. A method for producing semiconductor device of a type in which a bipolar transistor and an insulated gate field effect transistor are formed on one chip, said method comprising the steps of:

forming a collector region of said bipolar transistor of one conductivity type and a substrate region of said insulated gate field effect transistor of the opposite conductivity type in said chip,

forming an insulating layer on said collector region and said substrate region,

forming a base region in said collector region,

forming a collector contact hole in said insulating layer to selectively expose said collector region,

depositing a polycrystalline silicon layer over said insulating layer so as to fill said collector contact hole,

diffusing first impurities into said polycrystalline silicon layer, to lower the resistance thereof, and, simultaneously, into said collector region through said collector contact hole to form a collector contact region in said collector region,

selectively removing said polycrystalline layer to form a gate electrode of said insulated gate field effect transistor and a collector electrode of said bipolar transistor, said collector electrode contacting said collector contact region through said collector contact hole, and

selectively doping second impurities into the polycrystalline silicon collector electrode, said base region and said substrate region to form an emitter region of said bipolar transistor and source and drain regions of said insulated gate field effect transistor, said first impurities in said collector contact region being further diffused into said collector region during the formation of said emitter, source and drain regions, such that the depth of said collector region becomes larger than said emitter, source and drain regions.

4,927,777

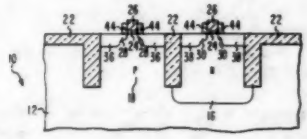
METHOD OF MAKING A MOS TRANSISTOR

Sheng T. Hsu, Lawrenceville, and Doris W. Flatley, Belle Mead, both of N.J., assignors to Harris Corporation, Melbourne, Fla.

Division of Ser. No. 301,074, Jan. 24, 1989, abandoned. This application Oct. 6, 1989, Ser. No. 418,762

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—44 **5 Claims**



1. A method of making a MOS transistor having source and drain extensions comprising the steps of:

forming on the surface of a substrate of single crystalline silicon a gate line of a conductive material with a layer of insulating material between the gate line and the substrate surface;

implanting a light dose of ions of a desired conductivity type into the surface of the substrate at each side of the gate line up to the side walls of the gate line;

providing a layer of polycrystalline silicon over the substrate surface on each side of the gate line and over the gate line;

heating the polycrystalline silicon layer in an oxidizing atmosphere to convert substantially the entire polycrystalline silicon layer to thermally grown silicon oxide;

removing the portions of the thermally grown silicon oxide on the substrate surface at each side of the gate line leaving spacers on the side walls of the gate line; and

implanting a heavier dose of the ions into the substrate surface at each side of the gate line up to the spacers to form the source and drains of the transistors.

4,927,778

METHOD OF IMPROVING YIELD OF LED ARRAYS

Daniel C. Abbas, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 5, 1988, Ser. No. 228,654

Int. Cl.[5] H01L *21/20, 21/66, 21/302*

U.S. Cl. 437—51 **5 Claims**

1. A method of fabricating integrated light emitting semiconductor diode arrays each comprised of a series of diodes arranged along a major axis comprising:

creating a plurality of diode arrays in a common semiconductor wafer containing parallel linear crystal iregularities that can result in the production of dark line defects in the completed diodes;

subdividing the wafer to produce a plurality of chips each containing at least one of the diode arrays; and

selecting diode arrays for use based on the diode to diode uniformity of light emission of the diodes in each array;

characterized by the steps comprising:

examining each semiconductor wafer in advance of formation of the diode arrays thereon to determine the nature and alignment of the parallel linear crystal irregularities; and

forming the diode arrays on the semiconductor wafer with their major axes parallel to the parallel linear crystal irregularities.

4,927,779

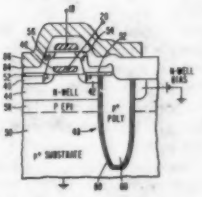
COMPLEMENTARY METAL-OXIDE-SEMICONDUCTOR TRANSISTOR AND ONE-CAPACITOR DYNAMIC-RANDOM-ACCESS MEMORY CELL AND FABRICATION PROCESS THEREFOR

Sang H. Dhong, Mahopac; Nicky C. Lu, Yorktown Heights, and Walter H. Henkels, Putnam Valley, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 230,410, Aug. 10, 1988. This application Oct. 27, 1989, Ser. No. 428,159

Int. Cl.[5] H01L *21/265, 27/10*

U.S. Cl. 428—52 **5 Claims**



1. A method for fabricating a memory cell for a semiconductor memory array comprising the steps of:

Step (1) disposed an epitaxial layer on a semiconductor

substrate and reactive ion etch a trench into the said epitaxial layer and substrate,

Step (2) form a composite oxide/nitride/oxide storage insulator layer on the walls inside said trench,

Step (3) fill said trench with polysilicon and planarize,

Step (4) form a retrograde n-well in said epitaxial layer by a surface impurity implant and a deep impurity implant,

Step (5) grow gate oxide and deposit polysilicon gate material for a PMOS type device and deposit an oxide film insulator layer over the PMOS gate and lithographically pattern said oxide film layer,

Step (6) implant dopants into said n-well to provide graded source/drain junctions for PMOS and NMOS transistor devices, respectively,

Step (7) open the surfaces of said source/drain regions for silicide formation wherein said gate element is protected from said silicide by said oxide film insulator layer formed in step (5),

Step (8) form a lightly doped silicon film over said silicide, gate oxide and isolation regions wherein said lightly doped silicon film is deposited in polycrystalline structure and recrystallized by beam annealing,

Step (9) define the NMOS type transistor device active area and grow thin NMOS gate oxide,

Step (10) adjust channel threshold voltages by an impurity implant,

Step (11) deposit polysilicon NMOS type transistor device gate material and pattern,

Step (12) form oxide spacer regions on said NMOS gate electrode edges,

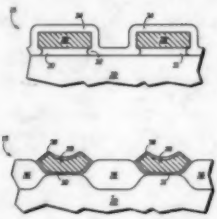
Step (13) implant dopants to obtain source/drain junctions for a transfer device and grow oxide to cover the device.

4,927,780

ENCAPSULATION METHOD FOR LOCALIZED OXIDATION OF SILICON

Scott S. Roth; Bich-Yen Nguyen; Philip J. Tobin; Wayne Ray, all of Austin; E. Petyr Wachholz, Cedar Park, and Glenn Wissen, Elgin, all of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 2, 1989, Ser. No. 415,685
Int. Cl.[5] H01L *21/76*
U.S. Cl. 437—69 **16 Claims**



1. A method for forming an integrated circuit device on a semiconductor substrate comprising the steps of:

forming a buffer layer to overlie said substrate;

depositing a layer of oxidation resistant material onto said buffer layer to form a composite layer comprising said buffer layer and said layer of oxidation resistant material over said buffer layer;

etching selected portions of said composite layer to expose portions of said substrate and to leave masking portions of said composite layer overlying said substrate;

etching said buffer layer to form a recess under an edge portion of said oxidation resistant layer of said masking portions;

depositing a conformal layer of oxidizable material to overlie said masking portions of said composite layer substantially filling said recess with said conformal layer; and

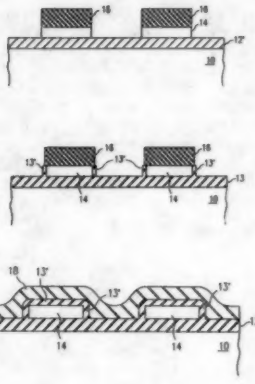
oxidizing said conformal layer and said exposed portions of said substrate to form electrical isolation regions in said exposed portions of said substrate.

4,927,781

METHOD OF MAKING A SILICON INTEGRATED CIRCUIT WAVEGUIDE

Robert O. Miller, 5523 Vaden St., Box 99701, The Colony, Tex. 75056

Filed Mar. 20, 1989, Ser. No. 326,104
Int. Cl.[5] H01L *21/76, 21/203*
U.S. Cl. 437—71 **11 Claims**



1. A method for fabricating a semiconductor waveguide, comprising:

providing a semiconductor substrate having a low or intrinsic level of dopant impurities;

forming a first layer of semiconductor material over one surface of the semiconductor substrate to a predetermined thickness;

forming a second layer of semiconductor material over the surface of the first layer of semiconductor material;

masking the upper surface of the second layer of semiconductor material with a masking layer;

patterning the second layer and masking to define at least one ridge;

selectively etching the second layer of semiconductor material and the masking layer in accordance with the pattern to etch the second layer down from the upper surface thereof and substantially to the upper surface of the first layer of semiconductor material to form at least one ridge having an upper surface and two substantially vertical surfaces and a lower surface adjacent the upper surface of the first layer of semiconductor material;

converting the first layer of semiconductor material to an insulating material adjacent the lower surface of the at least one ridge;

forming a layer of insulating material on the substantially vertical surfaces of the at least one ridge;

removing the masking layer from the upper surface of the at least one ridge; and

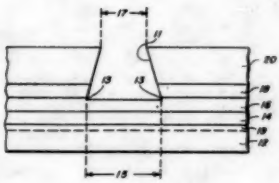
forming an insulating layer on the upper surface of the at least one ridge.

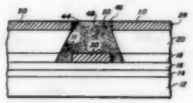
4,927,782

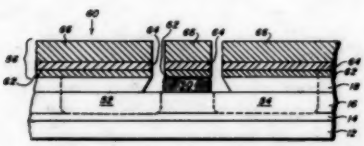
METHOD OF MAKING SELF-ALIGNED GAAS/ALGAAS FET'S

John E. Davey, Alexandria, and Aristos Christou, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 27, 1989, Ser. No. 371,778
Int. Cl.[5] H01L *21/338*
U.S. Cl. 437—184 **12 Claims**







1. A method of making a field effect transistor having a gate aligned with a source and drain, comprising the steps of:

obtaining a selectively doped heterostructure substrate having a heavily doped top layer capable of being etched by an orientation-dependent etchant, having a heavily doped etchant-resistant layer under the top layer that is resistant to etching by the orientation-dependent etchant, and having an underlying layer, the layers having a predetermined crystalline orientation,

depositing an uppermost layer on the top layer that is capable of being etched by the orientation-dependent etchant,

etching an angular recess through the uppermost layer and through the top layer of the heterostructure substrate with an orientation-dependent etchant down to the etchant resistant layer, said recess having a top length and a base length, wherein the length of the angular recess is wider at the base of the recess than at the top of the recess because of the predetermined crystalline orientation and the orientation-dependent etchant,

depositing a refractory metal in the recess to form the gate wherein the length of the refractory metal gate is substantially the same as the length of the top of the recess and depositing refractory metal on the top surface of the uppermost layer;

covering the refractory metal gate with an etch-resistant and organic-solvent-soluble material;

removing the refractory metal from the uppermost layer without removing the etch-resistant and organic-solvent-soluble material;

implanting source and drain regions with implantable ions into the etchant-resistant layer which is not substantially etched by the orientation-dependent etchant;

removing the uppermost layer and the etch-resistant and organic-solvent-soluble material, whereby the top surface of the refractory metal gate is uncovered; and

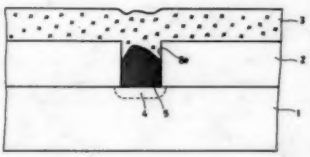
depositing metal contacts on the refractory metal gate and over the source and drain regions to complete fabrication of the self-aligned field effect transistor structure.

4,927,783

METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

Hajime Arai, and Hrioshi Harada, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 924,566, Oct. 28, 1986, abandoned. This application Apr. 11, 1988, Ser. No. 180,162
Claims priority, application Japan, Oct. 29, 1985, 60-244551
Int. Cl.[5] H01L *21/24, 21/28*
U.S. Cl. 437—196 **9 Claims**



1. A method for fabricating a semiconductor device, comprising the steps of:

forming an insulator layer on a silicon substrate;

opening a contact hole through said insulator layer;

forming an alloy film containing silicon, said alloy film being in contact with said silicon substrate at the bottom of said contact hole;

growing a filler of doped silicon at least on said silicon substrate in said contact hole by solid phase precipitation from said alloy film by heat treatment;

etching said alloy film away to leave at least said filler on said substrate in said contact hole; and

forming a conductor layer on said insulator layer, said conductor layer being in electric contact with said filler.

4,927,784

SIMULTANEOUS FORMATION OF VIA HOLE AND TUBE STRUCTURES FOR GAAS MONOLITHIC MICROWAVE INTEGRATED CIRCUITS

Thomas E. Kazior, Sudbury, and Mark S. Durschlag, Natick, both of Mass., assignors to Raytheon Company, Lexington, Mass.

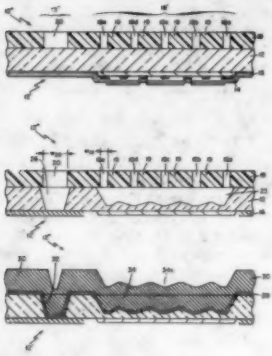
Division of Ser. No. 44,684, May 1, 1987, Pat. No. 4,807,022. This application Sep. 28, 1988, Ser. No. 250,207
Int. Cl.[5] H01L *21/306*
U.S. Cl. 437—203 **33 Claims**

1. A method of forming first and second recessed portions in a selected surface of a substrate, each recess having a different depth into said substrate, comprises the steps of:

providing a masking layer over the selected surface of the substrate:

patterning said masking layer to provide first and second regions in said masking layer, the first region disposed over the region of said first recess being patterned to provide at least one first aperture exposing an underlying

portion of said selected surface of said substrate, and the second region disposed over the region of said second recess being patterned to provide a plurality of separate spaced second apertures, exposing underlying portions of said selected surface of said substrate with said second apertures having a cross-sectional dimension which is smaller by a predetermined amount than the corresponding dimension of said one first apertures; and



etching said selected surface of said substrate through said first and second regions at least until the pattern etched through the plurality of separate spaced apertures, overlaps in the etched portion of the substrate, to provide the second recess, and said first region is etched to provide said first recess, with said first and second recesses having different depths.

4,927,785

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICES

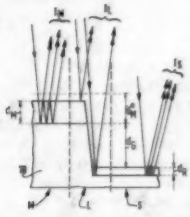
Jean-Bernard Theeten, Ozoir-La-Ferriere; Philippe Autier, Paris, and Jean Marc Auger, Joinville-Le-Pont, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 1, 1988, Ser. No. 201,514

Claims priority, application France, Jun. 4, 1987, 87 07796

Int. Cl.[5] H01L *21/66*

U.S. Cl. 437—225 **8 Claims**



1. In a method of manufacturing semiconductor devices using reactive ion plasma etching which method comprises the steps of

(a) forming an optical grating having a rectangular profile of grooves and mask strips on a sample material, each of said grooves having a width L_g and each of said mask strips having a width L_m, where L_g is substantially equal to L_m, said optical grating being formed of a material selected from one of a photoresist, a dielectric compound, a metal, or a metallic compound, and said sample material being formed of a material selected from one of a dielectric compound, a semiconductor compound, or alternate layers of different semiconductor material;

(b) illuminating said optical grating substantially perpendicularly to a surface of said optical grating with a laser beam, said laser beam having a wavelength λ, said widths L_g and L_m being larger in dimension than a dimension lc of the coherence zone of said laser beam;

(c) detecting specular reflection of said laser beam being reflected from said optical grating; and

(d) reactive ion etching said sample material through said optical grating.

4,927,786

PROCESS FOR THE FORMATION OF A SILICON-CONTAINING SEMICONDUCTOR THIN FILM BY CHEMICALLY REACTING ACTIVE HYDROGEN ATOMS WITH LIQUEFIED FILM-FORMING RAW MATERIAL GAS ON THE SURFACE OF A SUBSTRATE

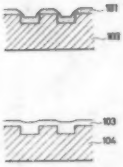
Shoji Nishida, Nagahama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 355,642, May 23, 1989, abandoned. This application Oct. 20, 1989, Ser. No. 425,350

Claims priority, application Japan, May 25, 1988, 63-123793

Int. Cl.[5] H01L *21/00, 21/02, 21/223, 21/383*

U.S. Cl. 437—233 **10 Claims**



1. A process for forming a silicon-containing semi-conductor thin film, said process which comprises the steps of making a film-forming raw material gas containing silicon atoms as the constituent atoms in the molecule to be adsorbed in liquid form on the cooled surface of a substrate and subsequently causing the liquefied film-forming raw material to chemically react with active hydrogen atoms to thereby solidify the silicon-containing material and form a silicon-containing semiconductor thin film on the surface of the substrate.

4,927,787

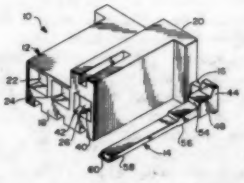
UNITARILY MOLDED ELECTRICAL CONNECTOR HOUSING WITH SEPARABLE KEY

Arvind Patel, Naperville, Ill., assignor to Molex Incorporated, Del.

Filed Feb. 9, 1989, Ser. No. 308,299

Int. Cl.[5] H01R *29/00*

U.S. Cl. 439—189 **4 Claims**



1. A molded switch connector housing and key structure comprising:

an electrical connector housing having at least one switch terminal cavity for receiving a pair of electrically conductive switch terminals therein, said electrical connector housing comprising at least one key aperture extending therethrough and into the switch terminal cavity; and

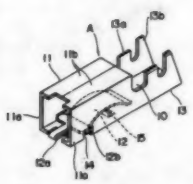
a key integrally molded with said electrical connector housing and selectively separable therefrom, said key comprising a blade dimensioned to pass through the key aperture of the housing for selective insertion into and removal from the switch terminal cavity thereof, the blade of said key being dimension ed to move at least one of the switch terminals relative to the other upon insertion of said key into the switch terminal cavity, whereby the separation of said key from said housing enables the key to selectively separate or permit contact between the switch terminals in said housing.

4,927,788

MONOLITHIC FEMALE CONNECTOR

Kazutaka Nakashima, and Kazuya Saito, both of Hachioji, Japan, assignors to Dowa Mining Co., Ltd. and Yazaki Corporation, both of Tokyo, Japan

Continuation-in-part of Ser. No. 177,997, Apr. 5, 1988, abandoned. This application Nov. 29, 1988, Ser. No. 277,496
Claims priority, application Japan, Apr. 8, 1987, 62-84653
Int. Cl.[5] C22C *9/06*
U.S. Cl. 439—887 **9 Claims**



1. A female connector of a monolithic structure comprising a spring element, a socket portion and a wire-connecting portion, said spring element, socket portion and wire-connecting portion being integrally formed as one piece by press-working and punching from a single thin plate made of a copper-base alloy consisting essentially of 7–15 wt % Ni, 1.0–2.0 wt % Al, not more than 0.0050 wt % 0_2 and the balance of Cu and incidental impurities, said thin plate having a uniform thickness.

4,927,789

RADIO PROGRAMMING DEVICE WITH ACCESS TO A REMOTE DATABASE

Thomas F. Shirley, Jr., Fort Worth, and Eric S. Goldsmith, Watauga, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 30, 1988, Ser. No. 175,002
Int. Cl.[5] H04B *17/00*
U.S. Cl. 455—67 **3 Claims**

1. A method for using a programming station to program a radio that operates in a communication system, which radio includes memory means for storing:

first radio feature parameters that may be changed by said programming station without approval from a remote central unit; and

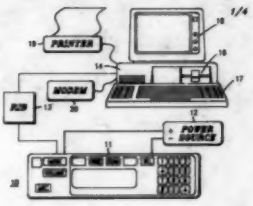
second radio feature parameters that should only be changed with approval from said remote central

said method including the steps of:

(A) coupling said programming station to said radio;

(B) accessing said remote central unit to: (i) provide information to said remote central unit regarding changes to at least some of said second radio feature parameters; (ii) receiving approved changed second radio feature parameters from said remote central unit;

(C) combining at least some of said approved changed second radio feature parameters with at least some of



said first radio feature parameters to provide combined parameters;

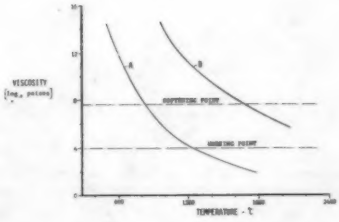
(D) storing said combined parameters in said memory means.

4,927,790

GLASS/FIBER COMPOSITE AND A METHOD OF ITS MANUFACTURE

John Bluege, Lake Park, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 86,343, Aug. 18, 1987, abandoned. This application Dec. 19, 1988, Ser. No. 287,566
Int. Cl.[5] C03C *14/00*
U.S. Cl. 501—32 **15 Claims**



1. A method of manufacturing a composite structure that includes fibers embedded in a glass matrix, comprising the steps of:

forming a precursor of the composite structure, including embedding the fibers in a matrix of silica-based glass material which contains a glass-forming additive that lowers the working temperature range of such material below that of pure silica; and

chemically leaching the additive out of the precursor to obtain a porous matrix consisting substantially of silica and containing the fibers.

4,927,791

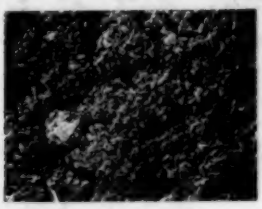
CHROMIUM CARBIDE SINTERED BODY

Kei Isozaki; Yutaka Hirashima, and Yasuo Imamura, all of Omuta, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1988, Ser. No. 253,674
Claims priority, application Japan, Oct. 6, 1987, 62-250729
Int. Cl.[5] C04B *35/56, 35/58*
U.S. Cl. 501—87 **8 Claims**

1. A chromium carbide sintered body having high toughness comprising 99.5 to 50% by weight of Cr_3C_2 and 0.5 to 50% b y weight of AlN, said sintered body being obtained by sinter-

ing Cr_3C_2 powders at a temperature of 1600° C. to 1750° C., and said sintered body containing not less than 20% by area of



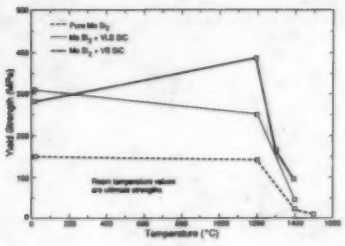
acicular crystals of Cr_3C_2 as observed from an SEM photograph.

4,927,792

MOLYBDENUM DISILICIDE MATRIX COMPOSITE

John J. Petrovic; David H. Carter, and Frank D. Gac, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 5, 1989, Ser. No. 362,112
Int. Cl.[5] C04B 35/56, 35/58
U.S. Cl. 501—92 2 Claims



1. A composition of matter consisting of molybdenum disilicide reinforced with silicon carbide whiskers dispersed throughout it, where each whisker is a single crystal having an aspect ratio of from about 5:1 to about 15:1 and where the dimensions of each whisker are from about 1 to about 5 microns long and from about 0.1 to about 0.5 micron in diameter.

4,927,793

PROTON CONDUCTIVE MATERIAL AND METHOD OF MANUFACTURING THEREOF

Saburo Hori, Tokyo, and Nobuhiro Watanabe, Matsudo, both of Japan, assignors to Kureha Chemical Industry Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1988, Ser. No. 235,735
Claims priority, application Japan, Aug. 20, 1987, 62-207138
Int. Cl.[5] C04B 35/46
U.S. Cl. 501—134 6 Claims

1. Proton conductive material comprising a compound of a monoclinic crystal structure which is in a reversibly reduced state from a compound of a similar monoclinic crystal structure represented by the general formula:

$$Na_xAl_yTi^{3+}{}_{x-y}Ti^{4+}{}_{8-x}O_{16}$$

in which $1.5 \leq x \leq 2$, $1.5 \leq y \leq 2$, $x \geq y$, the lattice parameter b_o of the compound of a monoclinic crystal structure in a reduced state being greater by more than 0.001 nm than the lattice parameter b_o of the compound of a similar monoclinic crystal structure represented by the general formula:

$$Na_xAl_yTi^{3+}{}_{x-y}Ti^{4+}{}_{8-x}O_{16}$$

wherein the compound of a monoclinic crystal structure in a reduced state is formed by applying a reducing treatment to the compound of a similar monoclinic crystal structure represented by the general formula: $Na_xAl_yTi^{3+}{}_{x-y}Ti^{4+}{}_{8-x}O_{16}$ in a hydrogen atmosphere and at a temperature of from 600° C. to 1000° C.

4,927,794

LEACHING COBALT, MOLYBDENUM, NICKEL, AND VANADIUM FROM SPENT HYDROPROCESSING CATALYSTS

Paul J. Marcantonio, Novato, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jun. 26, 1985, Ser. No. 749,614
Int. Cl.[5] B01J 38/66
U.S. Cl. 502—26 1 Claim

1. A process to extract cobalt, molybdenum, nickel, and vanadium values from spent hydroprocessing catalyst particles containing carbon residue comprising:

(a) roasting said spent catalyst in an oxygen-containing gas at a temperature of from 400° C. to 450° C.;

(b) contacting said roasted catalyst particles with an aqueous solution of ammonia, ammonium salt, and hydrogen peroxide at a temperature of from 50° C. to 95° C.; wherein said aqueous solution has an initial pH of at least 10.4, an initial hydrogen peroxide concentration of from 0.02 to 0.2M, an initial ammonia concentration of at least 2M, and an initial ammonium salt concentration of at least 0.5M; and wherein said aqueous solution is maintained at a pH of greater than 9.5; and

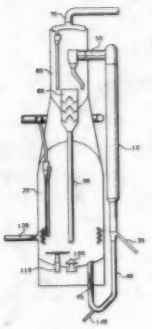
(c) repeating steps (a) and (b) to increase metals extraction.

4,927,795

PASSIVATION OF METAL CONTAMINATED CRACKING CATALYSTS

Donald C. Tabler, and Marvin M. Johnson, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 907,767, Sep. 15, 1986. This application Oct. 28, 1988, Ser. No. 264,293
Int. Cl.[5] B01J 21/20, 38/52, 38/50; C10G 11/04
U.S. Cl. 502—33 11 Claims



1. A method of restoring the activity of a hydrocarbon cracking catalyst in which the cracking activity of said catalyst is at least partially decreased by contaminating metals deposited thereon, comprising contacting said cracking catalyst with a metals passivating agent consisting essentially of

(a) water,

(b) particulate antimony oxide; and

(c) at least one suspending agent selected from the group consisting of dialkyl esters of phosphoric acid and the ammonium salt of carboxymethyl cellulose, said water being present in said passivating agent in an amount in the range of from about 10 to about 97 weight percent, said particulate antimony oxide being present in the range of from about 1 to about 30 weight percent, and said at least one suspending agent being present in the range of from about 0.5 to about 5 weight percent, said weight percentages being based on the total weight of the metals passivating agent.

4,927,796

COMPOSITION FOR PURIFYING LIQUIDS

Philip J. D'Angelo, Glen Mills; Richard Hetherington, Glenside, and Joseph J. Rogan, Levittown, all of Pa., assignors to Epicor Incorporated, Linden, N.J.

Division of Ser. No. 63,177, Jun. 17, 1987, Pat. No. 4,853,130, which is a continuation-in-part of Ser. No. 811,525, Dec. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 640,528, Aug. 14, 1984, abandoned. This application Feb. 13, 1989, Ser. No. 310,221

Int. Cl.[5] B01J *20/18*

U.S. Cl. 502—62 **20 Claims**

1. A composition useful as a pre-coat medium for purifying a liquid containing radioactive and/or other deleterious material, said composition being capable of flocculation in water and comprising: (A) a finely-divided zeolitic material and (B) a finely-divided ion-exchange resin material selected from the group consisting of: (a) an admixture of a strongly acidic cation exchange resin and a strongly basic anion exchange resin, (b) an admixture of a strongly acidic cation exchange resin and a weakly basic anion exchange resin, (c) an admixture of a weakly acidic cation exchange resin and a strongly basic anion exchange resin, and (d) a strongly basic anion exchange resin.

13. A composition according to claim 1, wherein said composition also includes a filter aid.

15. A composition according to claim 1, wherein said composition also contains a flocculating agent.

4,927,797

CATALYST SYSTEM FOR THE POLYMERIZATION OF OLEFINS

John A. Ewen, Houston, Tex., assignor to Fina Technology, Inc., Dallas, Tex.

Continuation of Ser. No. 36,080, Apr. 9, 1987, abandoned. This application Dec. 2, 1988, Ser. No. 282,985

Int. Cl.[5] C08F *4/64*

U.S. Cl. 502—127 **19 Claims**

1. In a system for the polymerization and copolymerization of olefins, the combination comprising:

(a) a solid catalyst component prepared by: (i) suspending a dialkoxy magnesium in an aromatic hydrocarbon that is liquid at normal temperatures, (ii) contacting the dialkoxy magnesium with a titanium halide and further contacting the resulting composition a second time with the titanium halide, and (iii) contacting the dialkoxy magnesium with a diester of an aromatic dicarboxylic acid at some point during the treatment with the titanium halide in (ii); and

(b) an electron donor described by the formula:

wherein R_1 is a bulky alkyl or cycloalkyl group containing at least one secondary or tertiary carbon atom; R_2 and R_3 are each independently an alkyl or aryl group; and R_4 is an alkyl group with an primary carbon atom attached to the silicon atom.

4,927,798

DIFFUSION-COATED METALS

Alfonso L. Baldi, Wynnewood, Pa., assignor to Alloy Surfaces Company, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 862,712, May 13, 1986, and a continuation-in-part of Ser. No. 830,767, Feb. 19, 1986, Pat. No. 4,799,979, and a continuation-in-part of Ser. No. 757,606, Jul. 22, 1985, and a continuation-in-part of Ser. No. 479,211, Mar. 28, 1983, and a continuation-in-part of Ser. No. 281,405, Jul. 8, 1981, Pat. No. 4,708,913. This application Mar. 23, 1987, Ser. No. 28,741

Int. Cl.[5] B01J *25/00, 25/02*

U.S. Cl. 502—301 **3 Claims**

1. The method of treating a pyrophorically-activated aluminum-containing iron, nickel or cobalt surface, which method is characterized by contacting the activated metal surface with an acid solution having a pH between 1 and 4 to attack the surface, and terminating the contact about ½ minute after the start of gassing caused by the attack, to increase the pyrophoric heat-generating characteristics of the treated metal.

4,927,799

CATALYST FOR THE PURIFICATION OF EXHAUST GAS

Shinichi Matsumoto, Aichi; Naoto Miyoshi; Mareo Kimura, both of Nagoya; Masakuni Ozawa, Kasugai, and Akio Isogai, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Kabushiki Kaisha Toyota Chuo Kenkyusho, both of Aichi, Japan

Continuation of Ser. No. 111,661, Oct. 23, 1987, abandoned. This application Dec. 27, 1988, Ser. No. 290,421

Claims priority, application Japan, Apr. 11, 1986, 61-262521; Apr. 11, 1986, 61-262522

Int. Cl.[5] B01J *21/06, 23/10, 23/40, 23/74*

U.S. Cl. 502—303 **20 Claims**

1. A catalyst for the purification of exhaust gases, comprising a support substrate, a catalyst carrier layer carried on said support substrate and catalyst ingredients carried thereon,

wherein said catalyst carrier layer comprises oxides of cerium and zirconium and a member selected from the group consisting of active alumina, zirconia and titanium oxide,

at least a part of each said oxide of cerium and zirconium is present in the form of a composite oxide and/or solid solution, and

said composite oxide and/or solid solution is formed by adding a cerium salt and a zirconium salt in the form of an aqueous solution on said member and burning at a temperature not less than 600° C.

4,927,800

ELECTRODE CATALYST AND METHOD FOR PRODUCTION THEREOF

Yoshinori Nishiki; Shuji Nakamatsu, both of Kanagawa, and Takayuki Shimamune, Tokyo, all of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan

Filed Nov. 28, 1988, Ser. No. 276,703

Claims priority, application Japan, Nov. 27, 1987, 62-297673

Int. Cl.[5] B01J *23/00*

U.S. Cl. 502—349 **16 Claims**

1. An electrode catalyst comprising a lead dioxide electrically deposited layer, said layer having particles containing β-lead dioxide powder dispersed therein.

4,927,801

DOUBLE CROSSLINKED BARRIER COATING

Meftah U. Mahmud, Nashua, N.H., assignor to Nashua Corporation, Nashua, N.H.

Filed Jul. 12, 1988, Ser. No. 218,097
Int. Cl.[5] B41M 5/18
U.S. Cl. 503—200 6 Claims

1. A heat sensitive recording material, comprising:

A. a substrate;

B. a thermal imagewise imprintable color producing layer fixed to a first surface of said substrate comprising a leuco dye developable upon exposure to an acidic developer, a binder material for said dye and developer, an acidic developer material and a basic, particulate neutralizing agent; and

C. a protective layer overlying said color producing layer, wherein said protective layer comprises an organic, water soluble resin ionically and covalently cross-linked throughout its thickness during its formation in situ atop said color producing layer and containing dispersed spacer particles.

4,927,802

PRESSURE-SENSITIVE MULTI-PART RECORD UNIT

Dennis D. Leatherman, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 9, 1988, Ser. No. 282,429
Int. Cl.[5] B41M 5/22
U.S. Cl. 503—214 16 Claims

1. In a pressure-sensitive multi-part record unit comprising:

(a) at least one transfer sheet having a front side and a back side, said back side comprising:

(1) a pressure-rupturable coating having entrapped therein a profuse number of minute liquid droplets comprising at least one leuco dye dissolved in solvent,

(2) pressure-rupturable microcapsules containing at least one leuco dye dissolved in solvent, or

(3) a combination thereof, wherein the leuco dye is reactive with finely divided, substantially water-insoluble siliceous particles upon contact therewith to form a color, and

(b) at least one receptor sheet having a front side and a back side, said front side of said receptor sheet comprising said siliceous particles,

the improvement wherein said front side of said receptor sheet comprises microporous material comprising:

(c) a matrix consisting essentially of substantially water-insoluble thermoplastic organic polymer,

(d) finely divided substantially water-insoluble filler particles, of which at least about 50 percent by weight are siliceous particles with which said leuco dye is reactive upon contact to form a color, said filler particles being distributed throughout said matrix and constituting from about 50 percent to about 90 percent by weight of said microporous material, and

(e) a network of interconnecting pores communicating substantially throughout said microporous material, said pores on a coating-free and impregnant-free basis constituting at least about 35 percent by volume of said microporous material.

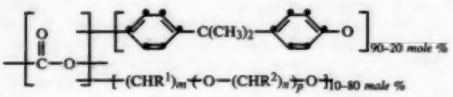
4,927,803

THERMAL DYE TRANSFER RECEIVING LAYER OF POLYCARBONATE WITH NONAROMATIC DIOL

David B. Bailey, Webster; Daniel J. Harrison, and Paul D. Yacobucci, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 28, 1989, Ser. No. 345,049
Int. Cl.[5] B41M 5/035, 5/26
U.S. Cl. 503—227 18 Claims

7. In a process of forming a dye transfer image comprising imagewise-heating a dye-donor element comprising a support having thereon a dye layer and transferring a dye image to a dye image-receiving layer of a receiving element to form said dye transfer image, the improvement wherein said dye image-receiving layer comprises a polycarbonate having a T_g from about 40° C. to about 100° C. and has the following formula:



wherein

R^1 and R^2 each independently represents hydrogen, methyl or ethyl;

m and n each independently represents an integer from 2 to 10; and

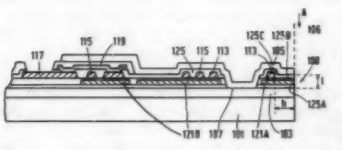
p is an integer from 0 to 6.

4,927,804

THIN-FILM TRANSFORMER AND MAGNETIC HEAD PROVIDED WITH SUCH A TRANSFORMER

Victor Zieren, and Jacobus J. M. Ruigrok, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jul. 12, 1988, Ser. No. 218,013
Claims priority, application Netherlands, Jul. 15, 1987, 8701667
Int. Cl.[5] G11B 5/14, 5/251
U.S. Cl. 505—1 2 Claims



1. A thin-film magnetic head comprising a first electrically conducting layer which constitutes an inductive transducing element, a face for magnetic flux coupling of the transducing element with a magnetic recording medium, a first magnetically permeable layer and a second magnetically permeable layer which together constitute a magnetic yoke having a transducing gap present on the face, the magnetically permeable layers extending on either side of the transducing element, characterized in that the magnetic head also has a second electrically conducting layer which together with the first electrically conducting layer and the magnetic yoke constitutes a transformer, said transformer further comprising a layer of superconducting material between the electrically conducting layers and one of the magnetically permeable layers which constitute the magnetic yoke.

4,927,805

HYDROLYSIS OF CURCUMIN

Joseph E. Dolfini; Jerome Glinka, both of Cincinnati, and Andrew C. Bosch, Mason, all of Ohio, assignors to Mallinckrodt, Inc., St. Louis, Mo.

Continuation-in-part of Ser. No. 123,137, Nov. 20, 1987, Pat. No. 4,810,824, which is a continuation-in-part of Ser. No. 10,902, Feb. 4, 1987, Pat. No. 4,709,098. This application Jan. 25, 1989, Ser. No. 301,873

Int. Cl.[5] A61K 7/46; C07C 47/575, 47/58

U.S. Cl. 512—27 18 Claims

1. A method of reacting curcumin with water to produce a flavor compound comprising at least one reaction product of curcumin and water, comprising:

hydrolyzing with heating curcumin in the presence of water at a temperature and pressure sufficient to effect the reaction and thereby produce said compound.

4,927,806

SATURATED SALT/CONCENTRATED DEXTRAN FORMULATION TO TREAT HEMORRHAGE

George C. Kramer, Davis, and Paul R. Perron, Citrus Heights, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Apr. 23, 1987, Ser. No. 41,605

The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.

Int. Cl.[5] A61K 37/02, 31/715

U.S. Cl. 514—2 15 Claims

1. A physiologically acceptable solution for treating hypodynamic circulatory shock in a mammal, said solution containing a crystalloid having a molecular weight less than about 1,000 in a concentration of at least about 5,000 mOsms and a colloid having a molecular weight in excess of 30,000 in a concentration of at least about 200 mm Hg.

7. A method of preventing or treating hypodynamic circulatory shock in a mammal, comprising the step of administering to said mammal in a condition of existing or impending shock, a therapeutically effective dose of a physiologically acceptable solution containing a crystalloid in a concentration of at least about 5,000 mOsms and a colloid in a concentration of at least 200 mm Hg.

4,927,807

GLAUCOMA TREATMENT

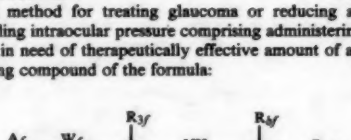
Herman H. Stein, Highland Park; Jacob J. Pattner, Libertyville, and Steven R. Crowley, Vernon Hills, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation-in-part of Ser. No. 105,636, Oct. 6, 1987, abandoned. This application Sep. 8, 1988, Ser. No. 240,567

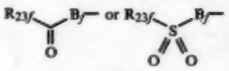
Int. Cl.[5] A61K 31/00, 31/415, 31/24, 31/18

U.S. Cl. 514—18 4 Claims

1. A method for treating glaucoma or reducing and/or controlling intraocular pressure comprising administering to a patient in need of therapeutically effective amount of a renin inhibiting compound of the formula:



wherein A_f is hydrogen, loweralkyl, arylalkyl, —OR_{10f} or —SR_{10f} wherein R_{10f} is hydrogen, loweralkyl or aminoalkyl, —$NR_{11f}R_{12f}$ wherein R_{11f} and R_{12f} are independently selected from hydrogen, loweralkyl, aminoalkyl, cyanoalkyl, hydroxyalkyl, carboxyalkyl, alkoxycarbonaylalkyl, (amino)carboxyalkyl, ((N-protected)amino)carboxyalkyl, (alkylamino)carboxyalkyl, ((N-protected)alkylamino)carboxyalkyl, (dialkylamino)-carboxyalkyl, (aminio)alkyoxycarbonylalkyl, ((N-protected-)amino)alkoxycarbonylalkyl, (alkyamino)alkoxycarbonylalkyl, ((N-protected)alkylamino)alkoxycarbonylalkyl and (dialkylamino)alkoxycarbonylalkyl; or A_f is



wherein B_f is NH, alkylamino, S, O, CH_2 or CHOH and R_{23f} is loweralkyl, cycloalkyl, aryl, arylalkyl, alkoxy, alkenyloxy, hydroxyalkoxy, dihydrooxyalkoxy, arylalkoxy, arylalkoxyalkyl, amino, alkylamino, dialkylamino, (hydroxyalkyl)(alkyl-)amino, (dihydroxyalkyl)(alkyl)amino, aminoalkyl, N-protected-aminoalkyl, alkylaminoalkyl, (N-protected)(alkyl)aminoalkyl, dialkylaminoalkyl, carboxyalkoxyalkyl, (alkoxycarbonyl-)alkoxyalkyl, carboxyalkyl, carboxyalkylamino, alkoxycarbonylalkyl, alkoxycarbonyalkylamino, (amino)carboxyalkyl, (amino)carboxyalkylamino, ((N-protected)amino)carboxyalkyl, ((N-protected)amino)-carboxyalkyamino, (alkylamino)-carboxyalkyl, (alkylamino)carboxyalkylamino, ((N-protected-)alkylamino-carboxyalkyl, ((N-protected)alkylamino)carboxyalkylamino, (dialkylamino)carboxyalkyl, (dialkylamino)carboxyalkylamino, (amino)alkoxycarbonylalkyl, (amino)alkoxycarbonylalkylamino, ((N-protected)amino)alkoxycarbonylalkyl, ((N-protected)amino)-alkoxycarbonylalkylamino, (alkylamino)alkoxycarbonylalkyl, (alkylamino)alkoxycarbonylalkylamino, ((N-protected)alkylamino)alkoxycarbonylalkyl, ((N-protected)alkylamino)alkoxycarbonylalkylamino, (dialkylamino)alkoxycarbonylalkyl, (dialkylamino)alkoxycarbonylalkylamino, aminocycloalkyl, aminoalkylamino, dialkylaminoalkyl(alkyl)amino, arylalkylamino, arylalky(alkyl-)amino, alkoxyalkyl(alkyl)amino, (polyalkoxy)-alkyl(alkyl-)amino, di-(alkoxyalkyl)amino, di-(hydroxyalkyl)amino, di-(polyalkoxy)alkyl)amino, polyalkoxy, (polyalkoxy)alkyl, (heterocyclic)alkyl or a substituted or unsubstituted heterocyclic wherein saturated heterocyclics may be unsubstituted, monosubstituted or disubstituted with hydroxy, oxo, amino, alkylamino, dialkylamino, alkoxy, polyalkoxy or loweralkyl; unsaturated heterocyclics may be unsubstituted or monsubstituted with hydroxy, amino, alkylamino, dialkylaminio, alkoxy, polyalkoxy or loweralkyl;

W_f C=O or CHOH;

U_f is CH_2 or NR_{2f}, provided that when W_f is CHOH then U_f is CH_2;

R_{1f} is loweralkyl, cycloalkylmethyl, benzyl, 4-methoxybenzyl, halobenzyl, (1-naphthyl)methyl, (2-naphthyl)methyl, (4-imidazolyl)methyl, (alpha,alpha)-dimethylbenzyl, 1-benzyloxyethyl, phenethyl, phenoxy, thiophenoxy or anilino; provided that when R_{1f} is phenoxy, thiophenoxy or anilino, then B_f is CH_2 or CHOH or A_f is hydrogen;

R_{2f} is hydrogen or loweralkyl;

R_{3f} is loweralkyl, loweralkenyl, ((alkoxy)alkoxy)loweralkyl, (thioalkoxy)alkyl, benzyl or heterocyclic ring substituted methyl;

R_{6f} is loweralkyl, cycloalkylmethyl or benzyl;

R_{af} is vinyl, formyl, hydroxymethyl or hydrogen;

R_{df} is hydrogen or loweralkyl;

R_{bf} and R_{ef} are independently selected from OH and NH_2; and

R_{cf} is hydrogen, loweralkyl, vinyl or arylalkyl; or a pharmaceutically acceptable salt or ester thereof.

4,927,808

γ-L-GLUTAMYL-L-CYSTEINE ETHYL ESTER AND PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME AS AN EFFECTIVE INGREDIENT

Shigehisa Kitahara, Hino; Akira Ohtsu, Ohme, and Katsuhiko Fujii, Hachioji, all of Japan, assignors to Teijin Limited, Osaka, Japan

PCT No. PCT/JP87/00475, § 371 Date Mar. 7, 1988, § 102(e) Date Mar. 7, 1988, PCT Pub. No. WO88/00182, PCT Pub. Date Jan. 14, 1988

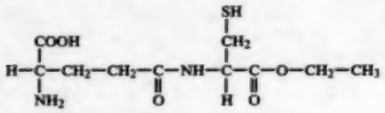
PCT Filed Jul. 7, 1987, Ser. No. 180,868

Claims priority, application Japan, Jul. 7, 1986, 61-157798; Mar. 11, 1987, 62-54229

Int. Cl.[5] A61K *37/02*; **C07K** *5/06, 5/10*

U.S. Cl. 514—19 **5 Claims**

1. γ-L-glutamyl-L-cysteine ethyl ester expressed by the following formula or its dimeric oxidized form:



wherein said dimeric oxidized form is formed by dehydrogenation between two molecules of said γ-L-glutamyl-L-cysteine ethyl ester.

4,927,809

OLIGOPEPTIDYL NITRILE DERIVATIVES, AGENTS CONTAINING THEM AND THEIR USE

Werner Stüber, Lahntal, Fed. Rep. of Germany, assignor to Behringwerke Aktiengesellschaft, Marburg/Lahn, Fed. Rep. of Germany

Filed Feb. 26, 1987, Ser. No. 19,122

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1986, 3606480

Int. Cl.[5] A61K *31/19, 31/40*; **C07C** *119/00*; **C07D** *207/00*

U.S. Cl. 514—20 **5 Claims**

1. A compound of the formula I

$$A—R—NH—CHR^1—(CH_2)_a—NHC(=NH)NH_2 \quad I$$

in which

R^1 is the cyanide group,

R is Pro or D-Phe-Pro,

A is a hydrogen atom or a protective group customary in peptide chemistry, and

a is an integer from 2 to 5, preferably 3 or 4,

and its physiologically tolerated salts.

4. A pharmaceutical composition for the treatment of diseases related to disorders of the coagulating system were there is an increased tendency of the blood to coagulate which comprises an effective amount for said treatment of a compound of the formula I as claimed in claim 1, together with a pharmaceutically acceptable vehicle.

4,927,810

EPOMYCIN G AND IT'S USE AS YIELD PROMOTER IN ANIMALS

Klaus Frobel, Wuppertal; Hartwig Müller, Velbert; Erwin Bischoff, Wuppertal; Olga Salcher, Wuppertal; Anno de Jong, Wuppertal; Friedrich Berschauer, Wuppertal, and Martin Scheer, Wuppertal-Elberfeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 6, 1987, Ser. No. 22,915

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608175

Int. Cl.[5] A61K *31/71*; **C07H** *7/06*

U.S. Cl. 514—23 **4 Claims**

4. A method of promoting the growth of animals which comprises supplying to such animals an animal growth promoting effective amount of efomycin G.

4,927,811

METHOD AND COMPOSITION FOR IMPROVED ANIMAL HUSBANDRY

Carey L. Quarles, Fort Collins, Colo., assignor to Coors Biotech, Inc., Westminster, Colo.

Filed Nov. 15, 1988, Ser. No. 271,931

Int. Cl.[5] A61K *33/00, 31/70*

U.S. Cl. 514—23 **18 Claims**

1. A method for raising poultry, comprising feeding said poultry a composition including an effective amount of fructooligosaccharides to enhance the breast weight to body weight ratio of said poultry.

4,927,812

MORPHOLINYL SILANES AND USE FOR CONTROL OF PLANT DISEASES CAUSED BY FUNGI

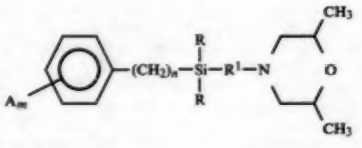
Chrislyn M. Carson, Midland, Mich.; Leonard G. Copping, Saffron Walden, England; Robert J. Ehr, Vallejo, Calif.; Melvin H. Gitlitz, Edison; Maynard W. McNeil, Washington, both of N.J.; Peter F. S. Street, Marlborough, and John W. Liebeschuetz, Wantage, both of England, assignors to Atochem North America, Inc., Somerville, N.J. and The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 111,374, Oct. 21, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 322,140

Int. Cl.[5] A01N *55/00*; **C07F** *7/10*

U.S. Cl. 514—63 **57 Claims**

1. A compound corresponding to the formula



wherein:

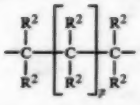
each A independently represents halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, phenyl, phenoxy or halomethyl;

each R independently represents C_1–C_4 alkyl;

n represents the integer 0, 1 or 2;

m represents the integer 0 to 5; and

R^1 represents an alkylene group of the formula



where each R^2 independently represents hydrogen or C_1–C_3 straight chain alkyl and p represents an integer of from 1 to 4, with the proviso that the total number of carbon atoms in R^1 is from 3–6.

4,927,813

METHOD AND COMPOSITION FOR TREATING PEDICULOSIS CAPITIS

Joel E. Bernstein, 615 Brierhill Rd., Deerfield, Ill. 60015

Filed Mar. 8, 1988, Ser. No. 165,473

Int. Cl.[5] A61K *7/06, 37/48*; **A01N** *63/02*

U.S. Cl. 514—65 **19 Claims**

1. A method of treating a human patient having *Pediculosis capitis* by removing the nits from the patient's hair and scalp, said method comprising;

applying a composition containing a nit cement-dissolving amount of formic acid to the hair and scalp of said patient;
maintaining said formic acid on said hair and scalp for a time period sufficient to dissolve the cement attaching said nits to said hair and scalp to provide detached nits; and
washing or rinsing said hair and scalp to remove said detached nits.

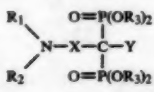
4,927,814

DIPHOSPHONATE DERIVATIVES, PHARMACEUTICAL COMPOSITIONS AND METHODS OF USE

Rudi Gall, Hirschberg, and Elmar Bosies, Weinheim, both of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Jul. 9, 1987, Ser. No. 71,471
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623397
Int. Cl.[5] C07F *9/38*; A61K *31/66*
U.S. Cl. 514—108 **12 Claims**

1. A diphosphonate compound of the formula



(I)

6. A method for the treatment or prophylaxis of calcium metabolism disturbance or disease comprising administering a pharmaceutically effective amount of the compound of claim 1.

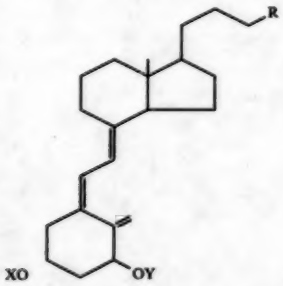
4,927,815

COMPOUNDS EFFECTIVE IN INDUCING CELL DIFFERENTIATION AND PROCESS FOR PREPARING SAME

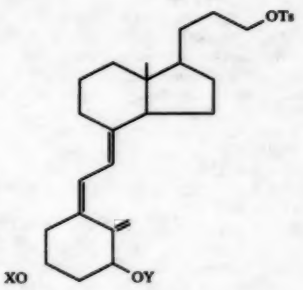
Hector F. DeLuca, Deerfield; Heinrich K. Schnoes; Kato L. Perlman, both of Madison, all of Wis., and Andrzej Kutner, Warsaw, Poland, assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Apr. 29, 1988, Ser. No. 187,680
Int. Cl.[5] A61K *31/59*; C07J *9/00*
U.S. Cl. 514—167 **26 Claims**

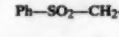
1. A process for the preparation of vitamin D compounds having the general structure:



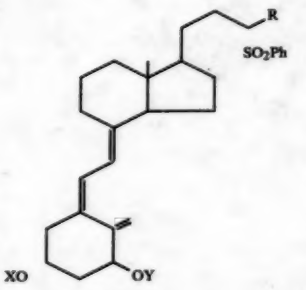
where X and Y, which may be the same or different, are selected from the group consisting of hydrogen and a hydroxy-protecting group, and where R is selected from the group consisting of alkyl, fluoro-substituted alkyl, hydroxy-substituted alkyl, hydroxy and fluoro-substituted alkyl, hydroxy-protected hydroxy-substituted alkyl and hydroxy-protected hydroxy- and fluoro-substituted alkyl, which comprises treating a vitamin D-22-tosylate derivative, of the general structure:



where X and Y are selected from the group consisting of hydrogen and hydroxy-protecting groups, with an alkylphenylsulfone derivative of the general structure:



wherein R is selected from the group consisting of alkyl, fluoro-substituted alkyl, hydroxy-substituted alkyl, and hydroxy- and fluoro-substituted alkyl, any hydroxy group present being preferably derivatized by hydroxy-protecting groups, thereby obtaining a side chain sulfone adduct, having the following general structure:



wherein X, Y and R represent the groupings defined above, and reductively desulfonating said side chain sulfone adduct so as to obtain the corresponding vitamin D compound, and, optionally removing the hydroxy-protecting groups present.

4,927,816

FORMULAE AND METHODS FOR SUBLINGUAL INGESTION OF NATURAL PROGESTERONE

George C. Ester, 9457 118th La., N. Seminole, Fla. 33542

Filed Aug. 20, 1987, Ser. No. 87,320
Int. Cl.[5] A61K *31/56*
U.S. Cl. 514—177 **12 Claims**

1. A pharmaceutical formula for the administration of Progesterone USP said formula comprising;
Progesterone USP milled such that at least seventy-five percent of the total amount is composed of particle sizes of less than five microns diameter;
said Progesterone USP being blended with a salivic stimulator in an amount adapted to stimulate sufficient saliva to dissolve said milled Progesterone USP but not enough to result in significant oral ingestion of Progesterone USP;
said mixture of Progesterone USP and salivic stimulator encapsulated within a soluble capsule.

4,927,817

PREVENTIVE AND THERAPEUTIC AGENT AGAINST LIVER DISORDER

Tetsuya Inagaki; Eijiro Tagashira, both of Saitama; Masahiro Takaya, Shiga, and Yasuhiro Nishimura, Osaka, all of Japan, assignors to Zeria Pharmaceutical Co., Ltd., Tokyo and Hamari Chemicals, Ltd., Osaka, both of, Japan

PCT No. PCT/JP87/00460, § 371 Date Dec. 27, 1988, § 102(e) Date Dec. 27, 1988, PCT Pub. No. WO88/00048, PCT Pub. Date Jan. 14, 1988

PCT Filed Jul. 2, 1987, Ser. No. 295,204

Claims priority, application Japan, Jul. 3, 1986, 61-155088

Int. Cl.[5] A61K *31/555*

U.S. Cl. 514—184 4 Claims

1. The method of treating against liver disorder comprising administering orally to an individual, subject to liver disorder, an agent containing carnosine zinc salt as an effective component and in an effective amount to treat said disorder.

4,927,818

CEPHEM COMPOUNDS AND PROCESSES FOR PREPARATION THEREOF

Takao Takaya; Kazuo Sakane; Kenzi Miyai, all of Kawanishi, and Koiji Kawabata, Osaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Aug. 28, 1987, Ser. No. 90,345

Claims priority, application United Kingdom, Sep. 22, 1986, 8622766; Nov. 24, 1986, 8628061; Mar. 4, 1987, 8705072; May 18, 1987, 8711653; Jul. 13, 1987, 8716437

Int. Cl.[5] A61K *31/545*; C07D *501/46*

U.S. Cl. 514—202 9 Claims

7. A compound of claim 1,

wherein R^2 is 1-carboxy-1-methylethyl or carboxymethyl.

4,927,819

CYCLO-OCTANE NEUROPROTECTIVE AGENTS

Raymond Baker, Much Hadham; William R. Carling, Bishops Stortford; Kim James, Welwyn Garden City, and Paul D. Leeson, Cambridge, all of England, assignors to Merck Sharp & Dohme Limited, Hoddesdon, England

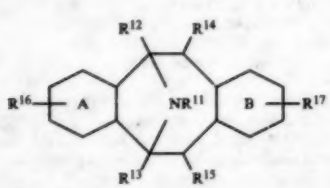
Filed Nov. 22, 1988, Ser. No. 274,436

Claims priority, application United Kingdom, Nov. 30, 1987, 8727989

Int. Cl.[5] A61K *31/435*; C07D *225/08*

U.S. Cl. 514—213 9 Claims

1. A compound of the formula II:



(II)

or a salt thereof, wherein rings A and B independently represent cyclohexane or benzene rings; R^{11} is selected from the group consisting of hydrogen and alkyl; and R^{12} to R^{17} independently represent hydrogen, hydroxy, C_{1-6} alkyl, C_{1-6} alkoxy or halogen.

4,927,820

FUSED HETEROCYCLIC DERIVATIVES OF 1,2,3,4-TETRAHYDROACRIDINE

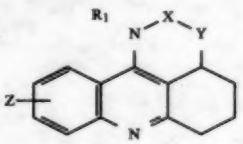
Gregory M. Shutske, Somerset, and Kevin J. Kapples, Little York, both of N.J., assignors to Hoechst Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Nov. 25, 1988, Ser. No. 276,259

Int. Cl.[5] C07D *498/00*

U.S. Cl. 514—229.5 13 Claims

1. A compound of the formula



where

R_1 is hydrogen, loweralkyl or arylloweralkyl;

Z is hydrogen, loweralkyl, loweralkoxy, hydroxy, nitro or trifluoromethyl;

Y is O or NR_2, R_2 being hydrogen, loweralkyl or arylloweralkyl; and

X is CR_3, CHR_3, C═O, C═S or $CHN(CH_3)_2$, R_3 being hydrogen, loweralkyl or aryl;

or a stereo isomer thereof or a pharmaceutically acceptable acid addition salt thereof.

4,927,821

ENOL ETHERS OF 6-CHLORO-4-HYDROXY-2-METHYL-N-(2-PYRIDYL)-2H-THIENO(2,3-E)-1,2-THIAZINE-3-CARBOXAMIDE 1,1-DIOXIDE, AND THEIR USE

Dieter Binder, Vienna; Franz Rovenszky, Bruck a.d. Leitha, and Hubert P. Ferber, Ansfelden, all of Austria, assignors to CL Pharma Aktiengesellschaft, Linz, Austria

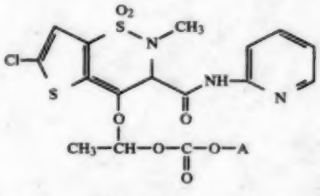
Filed Oct. 18, 1988, Ser. No. 262,499

Claims priority, application Austria, Oct. 29, 1987, 2855/87

Int. Cl.[5] A61K *31/54*; C07D *513/04*

U.S. Cl. 514—226.5 4 Claims

1. A compound of the formula



I

in which R denotes $(C_1–C_6)$-alkyl, $(C_5–C_7)$-cycloalkyl or benzyl.

4. A method for the treatment of inflammatory diseases, which comprises administering to a patient an effective amount of a compound of formula I as claimed in claim 1 in combination with pharmaceutically acceptable excipients, carrier or diluents.

4,927,822
1,3,4-THIADIAZOLES

Roger C. Brown, Loughborough; John Dixon, Melton Mowbray, and David H. Robinson, Shepshed, all of England, assignors to Fisons plc, Iswich, England

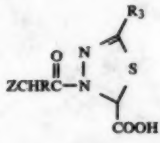
Filed Aug. 27, 1986, Ser. No. 901,048

Claims priority, application United Kingdom, Aug. 31, 1985, 8521697; Oct. 9, 1985, 8524932; Dec. 6, 1985, 8530143; Apr. 22, 1986, 8609793; May 17, 1986, 8612060

Int. Cl.[5] A61K *31/41;* C07D *285/12*

U.S. Cl. 514—236.2 19 Claims

1. A compound of formula I



(I)

in which R_3 is hydrogen, alkyl, C_{1-10}, cycloalkyl C_{3-10}, CF_3, SR_{10}, or a heterocyclic group selected from pyridyl, furyl and morpholinyl, said heterocyclic group being optionally substituted by alkyl C_{1-6}, halogen, alkoxy C_{1-6}, nitro, nitrile, CF_3, SR_6, NR_7R_{11} or hydroxy,

R_3 may also be adamantyl, methylamino, benzyl, naphthyl and phenyl optionally substituted by methylthio, methoxy, methyl, ethyl, chloro or CF_3.

R_6, R_7 and R_{11}, which may be the same or different, are each hydrogen or alkyl C_{1-10},

R_{10} is alkyl C_{1-10},

R is hydrogen, alkyl C_{1-10} or alkyl C_{1-6} substituted by NH_2,

Z is $R_2CH(COOH)NH$- or $R_1SCH_2R_1$ is hydrogen or R_8CO-,

R_8 is alkyl C_{1-10} or phenyl, and

R_2 is alkyl C_{1-10} or phenylalkyl C_{7-12} and pharmaceutically acceptable salts, esters and amides thereof.

17. A method of treatment of a hypertensive condition which comprises administration of an effective amount of a compound according to claim 1 to a patient suffering from such a condition.

4,927,823
FUNGICIDES

Ulrich Gisi, Wenslingen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Nov. 30, 1988, Ser. No. 278,054

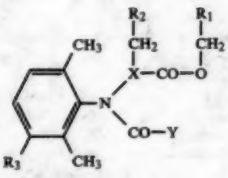
Claims priority, application United Kingdom, Dec. 2, 1987, 8728236

Int. Cl.[5] A01N *37/12, 43/08, 43/76, 43/84*

U.S. Cl. 514—237.5 8 Claims

1. A method of combatting phytophogenic fungi which comprises applying to the plants

(a) a compound of formula I



I

wherein

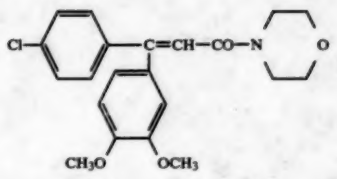
R_1 and R_2 together form a covalent bond,

R_3 is H,

X is N and

Y is CH_2OCH_3 in association with

(b) the compound of formula II



II

in a synergistic fungicidally effective aggregate amount wherein the weight ratio of the compound of formula I:the compound of formula II is in the range of from 1:1 to 1:6.5.

4,927,824
FUNGICIDAL TRISUBSTITUTED 1,3,5-TRIAZINE-2,4,6-TRIONES

Alfons Adler, Cologne; Arno Widdig, Odenthal; Engelbert Kühle, Bergisch-Gladbach; Wolfgang Führer, Cologne; Hermann Hagemann, and Gerd Hänssler, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

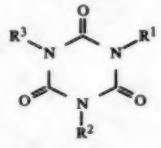
Filed Mar. 17, 1989, Ser. No. 324,948

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810080

Int. Cl.[5] A61K *31/53;* C07D *251/04*

U.S. Cl. 514—241 12 Claims

1. A trisubstituted 1,3,5-triazine-2,4,6-trione of the formula

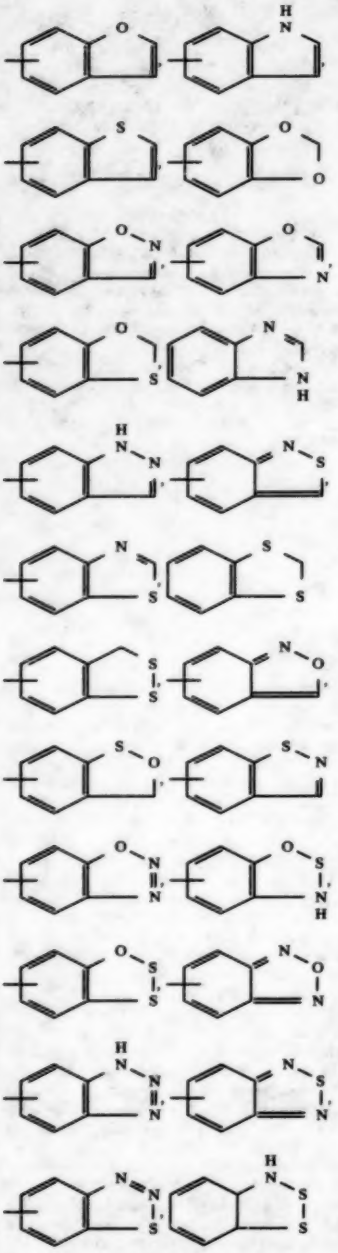


in which

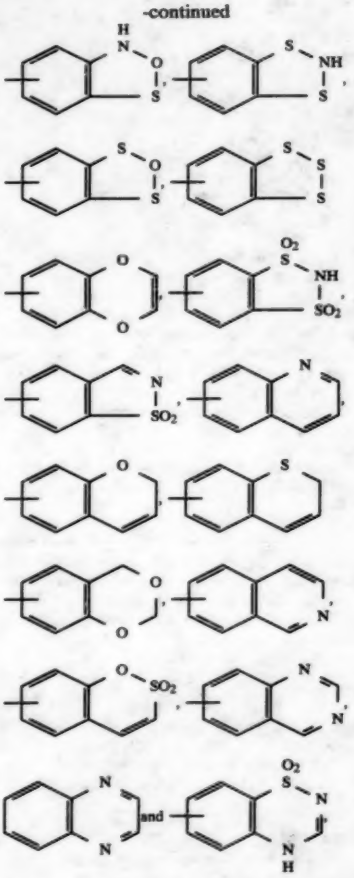
R^1 stands for straight-chain or branched alkyl which has 1 to 12 carbon atoms and which is unsubstituted or substituted once or more than once by identical or different substituents selected from the group consisting of halogen, alkoxy having 1 to 3 carbon atoms, halogenoalkoxy having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylthio having 1 to 3 carbon atoms, and halogenoalkylthio having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms; stands for phenyl which is unsubstituted or substituted once to five times by identical or different substituents selected from the group consisting of halogen, alkyl having 1 to 12 carbon atoms and alkoxy having 1 to 8 carbon atoms; or stands for cycloalkyl which has 3 to 8 carbon atoms and which is unsubstituted or substituted once to six times by identical or different substituents selected from the group consisting of halogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 3 carbon atoms, halogenoalkoxy having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylthio having 1 to 3 carbon atoms and halogenoalkylthio having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms,

R^2 stands for alkyl which has 1 to 4 carbon atoms, alkenyl which has 3 to 5 carbon atoms, alkinyl which has 3 to 5 carbon atoms, alkoxyalkyl which has 1 to 3 carbon atoms in both the alkoxy moiety and the alkyl moiety, alkylthioalkyl which has 1 to 3 carbon atoms in both the alkylthio moiety and the alkyl moiety, alkoxycarbonylalkyl which has 1 to 3 carbon atoms in the alkoxy moiety and 2 or 3 carbon atoms in the alkyl moiety, or for cyanoalkyl which has 1 to 5 carbon atoms in the alkyl moiety, and

R^3 stands for a heterocyclic radical selected from the group consisting of



-continued



which is completely unsaturated or completely or partially hydrogenated and which is unsubstituted in the isocyclic ring or substituted in the isocyclic ring by identical or different substituents selected from the group consisting of fluorine, chlorine, lower alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, trifluoromethyl, acyl having 2 to 4 carbon atoms, phenyl, chlorophenyl, and tolyl, and which is unsubstituted in the heterocyclic ring or substituted in the heterocyclic ring by identical or different substituents selected from the group consisting of fluorine, chlorine, lower alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, trifluoromethyl, acyl having 2 to 4 carbon atoms, phenyl, chlorophenyl, tolyl, and oxo.

10. A fungicidal composition comprising a fungicidally effective amount of a compound according to claim 1 and a diluent.

4,927,825

2-METHOXYCARBONYL SUBSTITUTED N,N'-DI-(TRIMETHOXYBENZOYL) PIPERAZINES, PROCESS FOR PREPARING THE SAME AND THERAPEUTICAL COMPOSITIONS CONTAINING THEM

Eduardo Pirotzky, Paris, France; Georges Dive, Tilff, Belgium; Jean-Jacques Godfroid, and Francoise Heymans, both of Paris, France, assignors to Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.), France

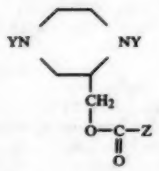
Filed Oct. 6, 1989, Ser. No. 418,113

Claims priority, application United Kingdom, Oct. 11, 1988, 8823776

Int. Cl.[5] A61K *31/495;* C07D *295/08, 295/10*

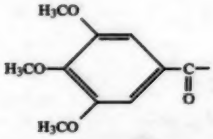
U.S. Cl. 514—255 2 Claims

1. Piperazine derivatives having the formula I:

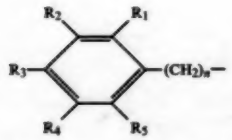


I

wherein Y stands for



and Z represents either a substituent A wherein A represents a straight or branched alkyl chain having from 1 to 17 carbon atoms; a cycloalkyl group having from 5 to 10 carbon atoms or a group of the formula:



wherein n is zero or an integer of from 1 to 5 and either each of R_1, R_2, R_3, R_4, and R_5, independently, represents a hydrogen, a chlorine or a bromine atom, a trifluoromethyl, a trifluoromethylthio or a trifluoromethoxy, a methyl or a methoxy group or a substituent NH-A wherein A is as above defined.

2. An anti-ischemic and anti-inflammatory therapeutic composition of matter comprising an effective amount of at least one compound according to claim 1, that is to say, per unit doses, 50 to 100 mg for oral administration or 5 to 100 mg for intravenous administration, associated with the usual excipients for the selected administration route.

4,927,826

CYCLOPROYLPROPENAMIDES USEFUL AS PLATELET ACTIVING FACTOR (PAF) ANTAGONISTS

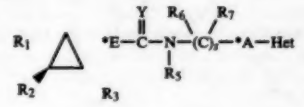
Robert W. Guthrie, Saddle Brook; Richard W. Kierstead, and Jefferson W. Tilley, both of North Caldwell, all of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Division of Ser. No. 72,390, Jul. 10, 1987, Pat. No. 4,786,646. This application Aug. 30, 1988, Ser. No. 238,224

Int. Cl.[5] C07D *239/42, 403/12;* A61K *31/505*

U.S. Cl. 514—256 18 Claims

1. A compound of the formula

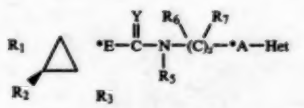


Y is O or S, *A is paraphenylene or *—$(CH_2)_n$—(X-)$_m$—$(CH_2)_r$—, X is O, S or —CH=CH—, n or r, independently, are integers from 0 to 3, s is an integer from 0 to 1, m is an integer from 0 to 1, provided that when m is 1, n+s must be at least 2, R_1 and R_2, independently, are hydrogen, lower alkyl, cycloalkyl, lower alkenyl, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, phenyl, lower alkoxy or nitro, *E is

or —$(CH_2)_k$— wherein k is an integer from 0 to 4, R_3, R_4 and R_8 are independently hydrogen or lower alkyl, R_5 and R_6, independently are hydrogen or lower alkyl, R_7 is hydrogen, lower alkyl, cycloalkyl, pyrimidinyl lower alkyl, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, phenyl, lower alkoxy or nitro Het is pyrimidinyl which may be substituted by lower alkyl, halogen or phenyl, and the asterisk denotes the point of attachment, or an enantiomer, diastereomers or racemic mixture thereof, as well as when *E is

a geometric isomer thereof, or a pharmaceutically acceptable acid addition salt thereof.

13. A method of treating a disease state characterized by an excess of platelet activating factor which comprises administration of a compound of the formula



Y is O or S, *A is paraphenylene or *—$(CH_2)_n$—(X-)$_m$—$(CH_2)_r$—, X is O, S or —CH=CH—, n or r, independently, are integers from 0 to 3, s is an integer from 0 to 1, m is an integer from 0 to 1, provided that when m is 1, n+s must be at least 2, R_1 and R_2, independently, are hydrogen, lower alkyl, cycloalkyl, lower alkenyl, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, phenyl, lower alkoxy or nitro, *E is

or —$(CH_2)_k$— wherein k is an integer from 0 to 4, R_3, R_4 and R_8 are independently hydrogen or lower alkyl, R_5 and R_6, independently are hydrogen or lower alkyl, R_7 is hydrogen, lower alkyl, cycloalkyl, pyrimidinyl lower alkyl, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, phenyl, lower alkoxy or nitro Het is pyrimidinyl which may be substituted by lower alkyl, halogen or phenyl, and the asterisk denotes the point of attachment, or an enantiomer, diastereomers or racemic mixture thereof, as well as when *E is

a geometric isomer thereof, or a pharmaceutically acceptable acid addition salt thereof.

4,927,827

PYRIDINYLPYRIMIDINE DERIVATIVES, METHOD FOR PRODUCTION THEREOF AND A FUNGICIDE CONTAINING THEM AS THE ACTIVE INGREDIENT

Tsuguhiro Katoh, Osaka; Kiyoto Maeda; Masao Shiroshita, both of Hyogo; Norihisa Yamashita, Osaka; Yuzuru Sanemitsu; Satoru Inoue, both of Hyogo; Masayo Sugano, Osaka, and Hirotaka Tanako, Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

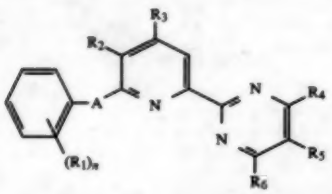
Filed May 19, 1988, Ser. No. 195,977

Claims priority, application Japan, May 19, 1987, 62-123188

Int. Cl.[5] C07D *239/34, 239/26;* A01N *43/54*

U.S. Cl. 514—256 6 Claims

6. A method for controlling plant pathogenic fungi which comprises applying a fungicidally effective amount of the pyridinylpyrimidine derivative of the formula:



wherein R_1, R_2, R_3, R_4, R_5, R_6, A and n are as defined in claim 1, to plant phathogenic fungi.

4,927,828

DIASTEREOISOMERIC TETRAHYDROPYRIDO-(2,3,D) PYRIMIDINE DERIVATIVES

Edward C. Taylor, Princeton, N.J.; George P. Beardsley, Essex, Conn.; Chuan Shih, Indianapolis, Ind., and Stephen R. Fletcher, Buckinghamshire, England, assignors to The Trustees of Princeton University, Princeton, N.J.

Continuation-in-part of Ser. No. 871,539, Jun. 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 835,457, Mar. 3, 1986, Pat. No. 4,684,653, which is a continuation-in-part of Ser. No. 709,622, Mar. 8, 1985, abandoned. This application Jun. 28, 1988, Ser. No. 220,944

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[5] C07D *487/04;* A61K *31/505*

U.S. Cl. 514—258 13 Claims

1. A compound selected from the group consisting of:

(i) the diastereoisomer of N-(4-[2-(2-amino-4-hydroxy-5,6,7,8-tetrahydropyrido[2,3-d]-pyrimidin-6-yl)ethyl]-benzoyl)-L-glutamic acid having a $[\alpha]_{589\ nm}^{25}$ of −21.06° and being substantially free of the isomer of N-(4-[2-(2-amino-4-hydroxy-5,6,7,8-tetrahydropyrido[2,3-d]pyrimidin-6-yl)ethyl]-benzoyl)-L-glutamic acid which has a $[\alpha]_{589\ nm}^{25}$ of +31.09°;

(ii) the 4(3H)-ox form thereof; and

(iii) a pharmaceutically acceptable alkali metal, alkaline earth, non-toxic metal, ammonium, or substituted ammonium salt thereof which is substantially free of the corresponding salt of that diastereoisomer which has a $[\alpha]_{589\ nm}^{25}$ of +31.09°.

4,927,829

HETEROCYCLIC COMPOUNDS AND ANTIULCER AGENTS

Shigeru Matsutani, and Yukio Mizushima, both of Osaka, Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

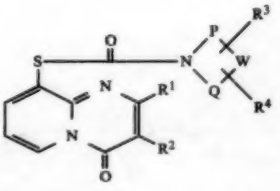
Filed Feb. 6, 1989, Ser. No. 306,752

Claims priority, application Japan, Feb. 18, 1988, 63-36130

Int. Cl.[5] C07D *487/02;* A61K *31/495*

U.S. Cl. 514—258 25 Claims

1. A compound of the formula:



wherein

R^1 and R^2 each is hydrogen, methyl, ethyl, methoxycarbonyl, or ethoxycarbonyl; R^3 and R^4, which may be bound to any of P, Q, and W, each is hydrogen, methyl, ethyl, methoxycarbonyl, ethoxycarbonyl, piperonyl, phenyl, methoxyphenyl, or α-phenyl-4-chlorobenzyl, or R^3 and R^4 taken together may form a condensed benzene ring; P and Q each is methylene or ethylene; W is single bond or —O—, —S—, or imino,

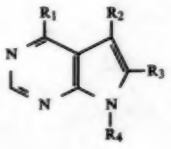
or a pharmaceutically acceptable acid addition salt thereof.

4,927,830
ACYCLIC PYRROLO[2,3-D]PYRIMIDINE ANALOGS AS ANTIVIRAL AGENTS

Leroy B. Townsend, and John C. Drach, both of Ann Arbor, Mich., assignors to The Regents of the University of Michigan, Ann Arbor, Mich.

Filed Apr. 8, 1988, Ser. No. 179,081
Int. Cl.[5] C07D *401/04;* A61K *31/40*
U.S. Cl. 514—258 26 Claims

1. A compound selected from the group consisting of compounds of the following formula and pharmaceutically acceptable salts thereof:



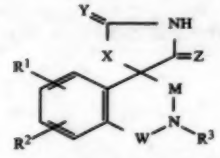
where
R_1 is NH_2 or NHOH;
R_2 is $CSNH_2$, Cl, Br, I, F, 2-buten-1-yl, 5-(1-hydroxyethyl) or 5-(1-methoxyethyl);
R_3 is H, NH_2 or Br; and
R_4 is (1,3-dihydroxy2-propoxy)methyl, (2-hydroxyethoxy)-methyl, (2-ethoxy)methyl, (2-acetoxyethoxy)methyl, 2-hydroxyl-(1,3-dihydroxy2-propoxy)ethyl, (2-phosphonylmethoxy)ethyl or 3-hydroxy-2-phosphonylmethoxypropyl.

4,927,831
SPIRO-ISOQUINOLINE-PYRROLIDINE TETRONES AND ANALOGS THEREOF USEFUL AS ALDOSE REDUCTASE INHIBITORS

Michael S. Malamas, Jamison, Pa., assignor to American Home Products, New York, N.Y.

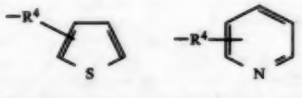
Continuation-in-part of Ser. No. 260,434, Oct. 20, 1988, abandoned. This application May 26, 1989, Ser. No. 357,563
Int. Cl.[5] A61K *31/47;* C07D *471/10*
U.S. Cl. 514—278 30 Claims

1. The compound of structural formula (I)



(I)

wherein R^1 and R^2 are independently hydrogen, alkyl containing 1 to 6 carbon atoms, halogen, lower alkoxy containing 1 to 6 carbon atoms, trifluoromethyl, lower alkylthio wherein lower alkyl contains 1 to 6 carbon atoms, dialkylamino wherein alkyl contains 1 to 6 carbon atoms, nitro, aryl or aryl (lower alkyl) oxy wherein aryl contains 6 to 10 carbon atoms and lower alkyl contains 1 to 6 carbon atoms; R^3 is hydrogen, lower alkyl containing 1 to 6 carbon atoms, aryl (lower alkyl) or halogen substituted aryl (lower alkyl) wherein aryl contains 6 to 10 carbon atoms and lower alkyl contains 1 to 6 carbon atoms, acyl or heterocyclic (lower alkyl) of structural formula



wherein R^4 is lower alkylene containing 1 to 3 carbon atoms; X is methylene, oxygen, sulfur or nitrogen; Y and Z are oxygen or sulfur; M and W are carbonyl, thiocarbonyl, sulfonyl, sulfoxo or, methylene, with the proviso that M and W are not both methylene when X is nitrogen, and the pharmaceutically acceptable salts thereof.

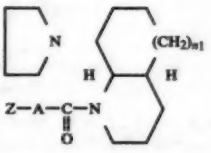
30. A method of preventing or relieving neuropathy, nephropathy, retinopathy, or cataracts in a diabetic mammal, which comprises administering to said mammal an alleviating or prophylactic amount of a compound of claim 1.

4,927,832
NOVEL TFTRAHYDROPYRIDINES HAVING ANALGESIC ACTIVITY

Francois Clémence; Daniel Frechet, and Michel Fortin, all of Paris, France, assignors to Roussel Uclaf, Paris, France

Filed Jul. 1, 1988, Ser. No. 214,673
Claims priority, application France, Jul. 3, 1987, 87 09449
Int. Cl.[5] C07D *401/04, 413/14, 417/14;* A61K *31/435*
U.S. Cl. 514—299 18 Claims

1. A compound selected from the group consisting of all enantiomeric and diasteroisomeric forms of tetrahydropyridines of the formula



I

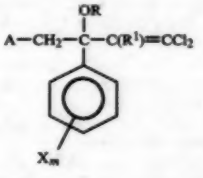
wherein n_1 is 0 or 2, A is selected from the group consisting of $—(CH_2)_{n2}—$ and alkylene substituted with alkyl having a total of 2 to 8 carbon atoms and n_2 is 0 to 5, Z is selected from the group consisting of phenyl, naphthyl, indenyl, thiazolyl, pyridinyl, oxazolyl, isoxazolyl, imidazolyl, thienyl, furyl, pyrimidinyl, indolyl, quinolyl, benzofuranyl, benzo thienyl, benzimidazolyl, benzoxazolyl and benzothiazolyl, each unsubstituted or substituted with at least one substituent from the group consisting of alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 5 carbon atoms, halogen, hydroxyl, trifluoromethyl, nitro, amino and monoalkyl- or dialkylamino with alkyls of 1 to 5 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts and quarternary ammonium salts.

4,927,833
SUBSTITUTED AZOLES AND THEIR USE AS FUNGICIDES

Neil V. Kirby, Wantage; Peter F. S. Street, Burbage, both of Great Britain, and Lowell D. Markley, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

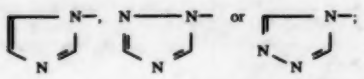
Filed Jan. 23, 1989, Ser. No. 299,911
Int. Cl.[5] C07D *233/60;* A01N *43/50*
U.S. Cl. 514—399 21 Claims

1. A substituted azole compound corresponding to the formulae



(Formula I)

wherein
A represents



R represents —H, C_1–C_4 alkyl, C_1–C_4 alkenyl, C_1–C_4 haloalkyl or —C(O)R^2;

R^1 represents —H, halo or C_1–C_4 straight chain alkyl;

R^2 represents C_1–C_4 alkyl, C_1–C_2 haloalkyl, phenyl, or phenyl substituted by lower alkyl or halo; each X independently represents —H, halo, —CN, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_1–C_4 alkoxy, C_1–C_4 alkoxy, C_1–C_4 alkoxysulfonyloxy, nitro or phenyl;

m represents 1 to 5; and

the acid addition salts and metal complexes thereof.

4,927,834

NEW 1,2-DIAMINO COMPOUNDS, PROCESSES FOR THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Herbert Leinert, Heppenheim; Christos Tsaklakidis, Weinheim, and Gisbert Sponer, Laudenbach, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

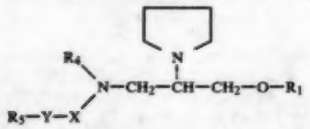
Filed Aug. 11, 1988, Ser. No. 230,946

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726633

Int. Cl.[5] A61K *31/40*; **C07D** *295/08*

U.S. Cl. 514—422 **11 Claims**

1. Compound of the general formula:



(I)

wherein R_1 is a straight-chained or branched C_2–C_6-alkenyl radical; R_4 is a phenyl radical which is unsubstituted or substituted at least once by C_1–C_6-alkyl, C_2–C_6-alkenyl, C_1–C_3-alkoxy, C_2–C_6-alkenyloxy, hydroxy-C_1–C_6-alkyl, C_2–C_6-alkylenedioxy, hydroxy-C_1–C_3-alkoxy, C_1–C_3 alkoxyethoxy, C_1–C_6-alkylamino, di(C_1–C_6-dialkyl)amino, C_1–C_3-alkoxycarbonylethyloxy, C_1–C_6-alkylthio, C_1–C_6-alkylsulphinyl, C_1–C_6-alkylsulphonyl, C_1–C_6-alkylsulphonyloxy, carboxy, C_1–C_3 alkoxycarbonyl, aminocarbonyl, mono- or di(C_1–C_6-alkyl)aminocarbonyl, halo-C_1–C_6-alkyl, cyano, or halogen; X is a straight-chained or branched, saturated or unsaturated aliphatic hyrocarbon radical containing up to 6 carbon atoms; Y is a valency bond or —O—; and R_5 is a phenyl radical which is unsubstituted or substituted at least once by C_1–C_6-alkyl, C_1–C_3-alkoxy, C_2–C_6-alkenyloxy, phenyl-C_1–C_3-alkoxy, hydroxy, hydroxy-C_1–C_3-alkoxy, C_1–C_3-alkoxy-C_1–C_3-alkoxy, C_1–C_3-alkoxycarbonyl-C_1–C_3-alkoxy, C_1–C_2-alkylenedioxy, di(C_1–C_6-alkyl)amino, C_1–C_6-alkylthio, C_1–C_6-alkylsulphinyl, C_1–C_6-alkylsulphonyl, C_1–C_6-alkylsulphonyloxy, hydroxy-C_1–C_6-alkyl, carboxy, C_1–C_3-alkoxycarbonyl, aminocarbonyl, mono- or di(C_1–C_6-alkyl)aminocarbonyl, cyano, or halogen; or a pharmacologically acceptable salt thereof.

10. A method of producing a blood vessel relaxing effect in a patient in need of such effect, comprising administering to said patient a blood vessel relaxing amount of a compound of claim 1.

4,927,835

ACYLPHENOL DERIVATIVES, USEFUL AS ANTI-INFLAMMATORY AGENTS AND PAIN SUPPRESSANTS

Masahiro Kise, Kyoto; Yoshihiko Yoshimoto, Kusatsu; Hiroshi Fujisawa, Otsu; Yasuo Sasaki, Kameoka, and Shoji Yasufuku, Kyoto, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

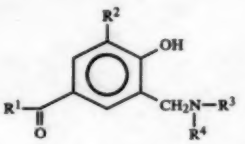
Filed Mar. 1, 1989, Ser. No. 317,601

Claims priority, application Japan, Mar. 4, 1988, 63-51977

Int. Cl.[5] A61K *31/38, 31/34, 31/40*; **C07D** *333/22*

U.S. Cl. 514—448 **24 Claims**

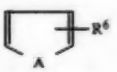
1. A compound of the formula



(I)

or a pharmaceutically acceptable salt thereof, wherein:

R^1 is

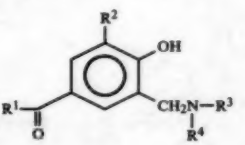


wherein A is sulfur, and R^6 is hydrogen, straight or branched chain alkyl of 1 to 4 carbon atoms or halo;

R^2 is straight or branched chain alkyl of 1 to 4 carbon atoms or cycloalkyl of 5 to 7 carbon atoms; and

R^3 and R^4 are the same or different and each is hydrogen; straight or branched chain alkyl of 1 to 8 carbon atoms unsubstituted or substituted by hydroxy, acyloxy of 2 to 5 carbon atoms, carboxyl or carbamoyl; straight or branched chain alkenyl of 2 to 6 carbon atoms; straight or branched chain alkynyl of 2 to 6 carbon atoms; or cycloalkyl of 5 to 7 carbon atoms.

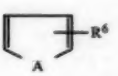
17. A method of treating pain, inflammation and fever in humans and animals, which comprises administering to a human or animal in need thereof a therapeutically effective amount of a compound of the formula



(I)

or a pharmaceutically acceptable salt thereof, wherein:

R^1 is



wherein A is sulfur, and R^6 is hydrogen, straight or branched chain alkyl of 1 to 4 carbon atoms or halo;

R^2 is straight or branched chain alkyl of 1 to 4 carbon atoms or cycloalkyl of 5 to 7 carbon atoms; and R^3 and R^4 are the same or different and each is hydrogen; straight or branched chain alkyl of 1 to 8 carbon atoms unsubstituted or substituted by hydroxy, acyloxy of 2 to 5 carbon atoms, carboxyl or carbamoyl; straight or branched chain alkenyl of 2 to 6 carbon atoms; straight or branched chain alkynyl

of 2 to 6 carbon atoms; or cycloalkyl of 5 to 7 carbon atoms, in combination with a pharmaceutically acceptable carrier.

4,927,836

AMIDE DERIVATIVES

Brian R. Holloway, Congleton; Ralph Howe, MacClesfield; Balbir S. Rao, Holmes Chapel, and Donald Stribling, Prestbury, all of England, assignors to Imperial Chemical Industries PLC, London, England

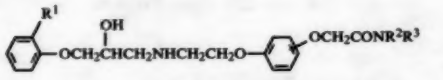
Continuation-in-part of Ser. No. 75,983, Jul. 21, 1987, abandoned. This application Jun. 29, 1988, Ser. No. 213,259

Claims priority, application United Kingdom, Jul. 23, 1986, 8617986; Jan. 28, 1987, 8701832

Int. Cl.[5] A61K *31/16, 31/165;* C07C *103/20*

U.S. Cl. 514—620 14 Claims

1. An amide derivative of the formula I set out below:



wherein R^1 is hydrogen or fluoro; R^2 is phenyl optionally bearing a substituent selected from the group consisting of halogeno, (1–4C)alkyl, (1–4C)alkoxy, trifluoromethyl, and nitro, (3–6C)cycloalkyl, (1–4C)alkyl in which the carbon atom linked to the nitrogen of NR^2R^3 bears one or two hydrogens, or is (3–4C)alkenyl, either of which latter groups may optionally bear a substituent selected from the group consisting of hydroxy, (1–4C)alkoxy, phenyl and chlorophenyl; and R^3 is hydrogen, methyl or ethyl; or a pharmaceutically acceptable acid-addition salt thereof.

14. A method for producing a thermogenic effect in a warm-blooded animal requiring such treatment which comprises administering to said animal a thermogenically effective amount of a compound of the formula I, or of a pharmaceutically acceptable acid-addition salt thereof, as defined in claim 1.

4,927,837

DERIVATIVES OF 3-PIPERIDINE CARBALDEHYDE OXIME AND THEIR USE AS MEDICAMENTS

Giulio Galliani; Fernando Barzaghi, both of Monza; Carla Bonetti, Fontanella, and Emilio Toja, Milan, all of Italy, assignors to Roussel Uclaf, Paris, France

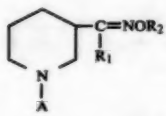
Filed Dec. 30, 1988, Ser. No. 292,257

Claims priority, application Italy, Dec. 30, 1987, 23280 A/87

Int. Cl.[5] A61K *31/445;* C07D *211/28*

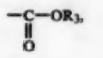
U.S. Cl. 514—331 15 Claims

1. A compound of formula (I):



(I)

in which R_1 represents hydrogen, a linear, branched or cyclic alkyl, alkenyl or alkynyl radical, each containing up to 8 carbon atoms, R_2 represents hydrogen, a linear, branched or cyclic alkyl, alkenyl or alkynyl radical, each containing up to 8 carbon atoms, a $COalk_1$ radical or $(CH_2)_2\ N(alk_2)_2$ radical, alk_1 and alk_2 representing an alkyl radical containing up to 8 carbon atoms, and A represents hydrogen, hydroxy, acetoxy or benzoyloxy, a linear, branched or cyclic alkyl, alkenyl or alkynyl radical, each containing up to 8 carbon atoms, optionally substituted by a carboxy radical or an alkoxy carbonyl group in which the alkoxy radical contains up to 8 carbon atoms, A represents benzyl, or A represents



in which R_3 represents a linear, branched or cyclic alkyl, alkenyl or alkynyl radical, each containing up to 8 carbon atoms, phenyl, benzyl, or an alkylsulphonylalkyl radical containing up to 18 carbon atoms, as well as its pharmaceutically acceptable addition salts with acids.

15. A method of treating a patient suffering from Alzheimer's disease, senile dementia, or memory loss in the aged, comprising administering to the patient a cholinomimetically effective amount of a compound as defined in any one of claims 1 to 5 and 8 to 13.

4,927,838

PYRIDINE COMPOUNDS WHICH ARE USEFUL IN TREATING A DISEASE STATE CHARACTERIZED BY AN EXCESS OF PLATELET ACTIVATING FACTORS

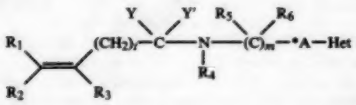
Robert W. Guthrie, Saddle Brook; Richard W. Kierstead, North Caldwell; John G. Mullin, Hawthorne, and Jefferson W. Tilley, North Caldwell, all of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 179,616, Apr. 11, 1988, abandoned, which is a continuation-in-part of Ser. No. 72,199, Jul. 10, 1987, abandoned. This application Jul. 5, 1988, Ser. No. 215,464

Int. Cl.[5] A61K *31/44;* C07D *409/12*

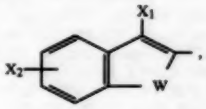
U.S. Cl. 514—337 40 Claims

29. A method of treating a disease state characterized by an excess of platelet activating factor which comprises administering a compound of the formula



I

wherein Y and Y' are hydrogen or taken together are O or S, *A is paraphenylene or $*-(CH_2)_n-(X)_s-(CH_2)_r-$, X is O, S or —CH=CH—, n or r, independently, are integers from 0 to 3, m is an integer from 0 to 1, s is an integer from 0 to 1, provided that when s is 1, n+m must be at least 2, t is an integer from 0 to 10, R_1 and R_2, independently, are lower alkyl, lower alkenyl, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di-or trisubstituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro or phenyl unsubstituted or mono-, di-or trisubstituted by lower alkoxy, lower alkyl or halogen, or one of R_1 or R_2 is hydrogen and the other is



wherein W is

$-CH_2-CH_2-$, $-CH_2-$, O, S or

and

X_1 is lower alkyl, phenyl unsubstituted or mono-, di- or trisubstituted by lower alkoxy, lower alkyl or halogen, and X_2, X_3 and X_4, independently, are hydrogen, lower alkyl, lower alkoxy or halogen, R_3 is hydrogen, lower alkyl, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro or phenyl unsubstituted or mono-, di- or trisubstituted by lower alkoxy, lower alkyl or halogen, R_4 is hydrogen, lower alkyl, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro or phenyl unsubstituted or mono-, di- or trisubstituted by lower alkoxy, lower alkyl or halogen, naphthalenyl-lower alkyl, phenyl-lower alkyl, or phenyl-lower alkyl or naphthalenyl-lower alkyl wherein phenyl or naphthalenyl are mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro or phenyl unsubstituted or mono-, di- or trisubstituted by lower alkoxy, lower alkyl or halogen, or alkanoyl of 1 to 7 carbon atoms, naphthalenyl-alkanoyl of 1 to 7 carbon atoms, phenyl-alkanoyl of 1 to 7 carbon atoms or phenylalkanoyl of 1 to 7 carbon atoms or naphthalenyl-alkanoyl of 1 to 7 carbon atoms wherein phenyl or naphthalenyl are mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro or phenyl unsubstituted or mono-, di- or trisubstituted by lower alkoxy, lower alkyl or halogen, R_5 is hydrogen or lower alkyl, R_6 is hydrogen, lower alkyl, cycloalkyl, pyridinyl-lower alkyl, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di- or trisubstituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro or phenyl unsubstituted or mono-, di- or trisubstituted by lower alkoxy, lower alkyl or halogen, Het is pyridinyl unsubstituted or substituted by lower alkyl, halogen or phenyl, which radical may be substituted by lower alkyl, halogen, naphthalenyl, phenyl or phenyl or naphthalenyl mono-, di-or trisubstituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro or phenyl unsubstituted or mono-, di-or trisubstituted by lower alkoxy, lower alkyl or halogen, and the asterisk denotes the point of attachment,

or, when R_5 and R_6 are different, an enantiomer or racemic mixture thereof, when R_1 and R_2 are different, a geometric isomer thereof, or a pharmaceutically acceptable acid addition salt thereof.

4,927,839

METHOD OF PREVENTING FUNGAL ATTACK ON WOOD, HIDES, LEATHER OR PAINT FILMS USING A TRIAZOLE

Keith P. Parry; Paul A. Worthington, both of Maidenhead, and William G. Rathmell, Wokingham, all of England, assignors to Imperial Chemical Industries PLC, London, England

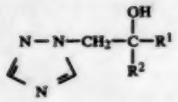
Continuation of Ser. No. 579,012, Feb. 10, 1984, Pat. No. 4,595,406, which is a division of Ser. No. 183,410, Sep. 3, 1980, Pat. No. 4,551,469, which is a continuation-in-part of Ser. No. 124,253, Feb. 25, 1980, Pat. No. 4,654,332. This application Apr. 23, 1986, Ser. No. 854,819

Claims priority, application United Kingdom, Mar. 7, 1979, 7908003; Sep. 21, 1979, 7932819; Feb. 15, 1980, 8005141; Aug. 18, 1980, 8026884

Int. Cl.[5] A01N *43/653*; C07D *249/08*

U.S. Cl. 514—383 **1 Claim**

1. A method of preventing fungal attack on wood, hides, leather and paint films which comprises applying thereto an effective amount of a compound of formula (I)



wherein R^1 is C_{1-5} alkyl, or halophenyl, and R^2 is halophenyl or halobenzyl.

4,927,840

FUNGICIDAL IMIDAZOLE DIOXOLANE AND 1,3-DIOXANE DERIVATIVES

John R. H. Wilson, and Roger B. Pettman, both of Kent, England, assignors to Shell Internationale Research Maatschappij B.V., The Hague

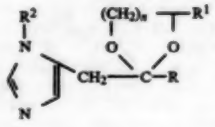
Filed Nov. 4, 1988, Ser. No. 267,166

Claims priority, application United Kingdom, Nov. 13, 1987, 8726662

Int. Cl.[5] A01N *43/50*; C07D *405/06*

U.S. Cl. 514—397 **11 Claims**

1. A compound of the formula



(I)

or an acid-addition salt or metal salt complex thereof, in which R represents an optionally substituted phenyl group; R^1 represents a hydrogen atom or an optionally substituted alkyl or alkenyl group; R^2 represents an optionally substituted alkyl group; and n is 1 or 2.

8. A fungicidal composition which comprises a carrier and, as active ingredient, a fungicidally effective amount of a compound of formula I, or an acid-addition salt or metal salt complex thereof, as defined in claim 1.

4,927,841

FUNGICIDAL IMIDAZOLE OXIME DERIVATIVES

John R. H. Wilson, Rainham; Roger B. Pettman, and Derek J. Reid, both of Sittingbourne, all of England, assignors to Shell Internationale Research Maatschappij, B.V., The Hague, Netherlands

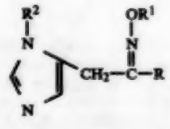
Filed Nov. 4, 1988, Ser. No. 267,154

Claims priority, application United Kingdom, Nov. 6, 1987, 8726109

Int. Cl.[5] A01N *43/50*

U.S. Cl. 514—400 **12 Claims**

1. A fungicidal composition comprising a carrier and, as active ingredient, a fungicidally-effective amount of a compound of the formula:



(I)

or an acid-addition salt or metal salt complex thereof,

wherein R represents an optionally substituted phenyl group;

R^1 represents an optionally substituted alkyl, alkenyl, alkynyl or aralkyl group; and

R^2 represents an optionally substituted alkyl group.

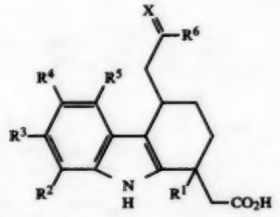
4,927,842

2,3,4,9-TETRAHYDRO-1H-CARBAZOLE ACETIC ACID DERIVATIVES, COMPOSITION AND USE AS ANTI-INFLAMMATORIES

Dominick Mobilio, Franklin Park, N.J., assignor to American Home Products Corporation, New York, N.Y.

Filed Sep. 29, 1989, Ser. No. 415,159
Int. Cl.[5] A61K *31/40*; C07D *209/82, 209/94*
U.S. Cl. 514—411 14 Claims

1. A compound of the formula (I)



(I)

wherein R^1 is lower alkyl containing one to six carbon atoms; R^2 to R^5 are independently selected from the group consisting of H, lower alkyl containing one to six carbon atoms, halogen and haloalkyl containing one to six carbon atoms; R^6 is H, lower alkyl containing one to six carbon atoms; X is O, NOH, or NO-alkyl containing one to six carbon atoms; or a pharmaceutically acceptable salt thereof.

13. A method for treating inflammatory conditions in a mammal which comprises the administration to said mammal of an effective amount of a compound selected from those of formula (I), or a pharmaceutically acceptable salt thereof, as defined in claim 1.

4,927,843

ANTIVIRAL COMPOSITIONS

Ysel Teitz, Ramat-Gan, Israel, assignor to Ramot Univ. Authority for Applied Res. & Devp. Ltd., Tel-Aviv, Israel

Continuation-in-part of Ser. No. 948,415, Dec. 31, 1986, abandoned. This application Mar. 14, 1988, Ser. No. 167,507
Claims priority, application Israel, Jan. 1, 1986, 77496
Int. Cl.[5] A61K *31/40*
U.S. Cl. 514—418 7 Claims

1. A method for inhibiting the production of human viruses of the Retroviridae family, comprising treating a human infected with said virus with a production inhibiting amount of a compound selected from the group consisting of:
1-methylisatin-beta-4';4'-diethylthiosemicarbazone;
1-allylisatin-beta-4';4'-dimethylthiosemicarbazone; and
1-allylisatin-beta-4';4'-diethylthiosemicarbazone.

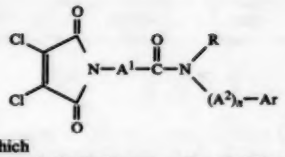
4,927,844

N-SUBSTITUTED DICHLOROMALEIMIDES, AND ANTI-BACTERIAL AND FUNGICIDAL USE THEREOF

Detlef Wollweber, Wuppertal; Wolfgang Krämer, Burscheid; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duesseldorf, and Gerd Hansler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 10, 1988, Ser. No. 269,938
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738591
Int. Cl.[5] C07D *207/452*; A01N *37/30*
U.S. Cl. 514—425 10 Claims

1. An N-substituted dichloromaleimide of the formula



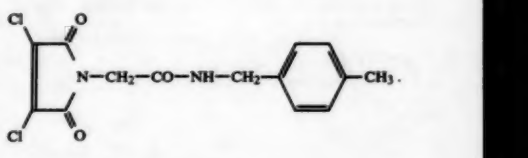
in which

R stands for hydrogen or for alkyl having 1 to 6 carbon atoms,

Ar stands for unsubstituted phenyl or phenyl which is mono-, di- or tri-substituted by non-sterically hindering identical or different substituents selected from the group consisting of halogen; cyano; nitro; alkyl; alkoxy or alkylthio, each having 1 to 4 carbon atoms; halogenoalkyl, halogenoalkoxy, dioxyhalogenoalkylene or halogenoalkylthio, each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms; alkenyl, alkinyl, alkenyloxy or alkinyloxy, each having 3 to 6 carbon atoms; cycloalkyl having 3 to 7 carbon atoms; alkoxycarbonylalkyl or alkoxyalkyl, each having 1 to 4 carbon atoms in the individual alkyl moieties; phenyl, benzyl, phenoxy, benzyloxy, each being unsubstituted or mono-substituted by substituents selected from the group consisting of halogen and alkyl having 1 to 4 carbon atoms,

A^1 and A^2 independently of one another each stand for unsubstituted or phenyl-substituted, alkylene having 1 to 8 carbon atoms, where the phenyl substituent is unsubstituted or mono-substituted by substituents selected from the group consisting of halogen; alkyl, alkoxy, halogenoalkyl or halogenoalkoxy, each having 1 to 4 carbon atoms, and, in the case of halogenoalkyl or halogenoalkoxy, having 1 to 9 identical or different halogen atoms, and n stands for a number 0 or 1, and pure isomers or isomer mixtures thereof, with the exception of the compound 2-(dichloromaleimido)-acetanilide.

5. A compound according to claim 1 wherein such compound is 2-(dichloromaleimide)-N-(4-methylbenzyl)-acetamide of the formula



4,927,845

COMPOUNDS OF THE ANTHRAQUINONE SERIES

John M. Bruce, Wilmslow, United Kingdom, assignor to The Victoria University of Manchester, Manchester, England

PCT No. PCT/GB88/00912, § 371 Date Aug. 15, 1989, § 102(e) Date Aug. 15, 1989, PCT Pub. No. WO89/03822, PCT Pub. Date May 5, 1989
PCT Filed Oct. 21, 1988, Ser. No. 377,835
Claims priority, application United Kingdom, Oct. 22, 1987, 8724799; Oct. 22, 1987, 8724800
Int. Cl.[5] C07C *149/36*; A61K *31/10*
U.S. Cl. 514—440 5 Claims

1. Organic compounds useful for the treatment of psoriasis which are analogue of anthralin compound is a "spiro" derivative in which the 10-carbon atom of the anthralin ring is part of a heterocyclic ring formed by utilising both valencies of the 10-carbon atom which are not taken up in the anthralin ring system and an sulphur atom attached to the 10-carbon atom of the anthralin ring.

5. Procedure for treatment of psoriasis in which a thio-substituted anthralin as claimed in claim 1 is the treatment agent.

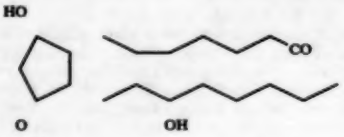
4,927,846

INTRAOCULAR PRESSURE REDUCING 1,11-LACTONE PROSTAGLANDINS

Charles Gluchowski, Mission Viejo, Calif., assignor to Allergan, Inc., Irvine, Calif.

Filed Nov. 23, 1988, Ser. No. 275,465
Int. Cl.[5] A61K *31/335*
U.S. Cl. 514—450 **4 Claims**

1. A method of treating ocular hypertension which comprises topically administering to the eye an intraocular pressure treating amount of a 1,11-lactone of $PGF_{2\alpha}$, the compound having the following formula:



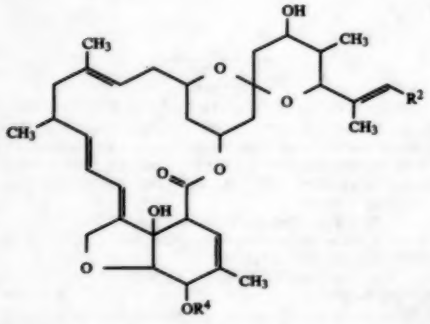
4,927,847

NOVEL C.25 (SUBSTITUTED (2-PROPENYL))-MILBEMYCINS

Christopher J. Dutton, and David A. Perry, both of New York, N.Y., assignors to Pfizer Inc., New York, N.Y.

Continuation of Ser. No. 227,921, Aug. 3, 1988, abandoned. This application Jul. 18, 1989, Ser. No. 382,016
Claims priority, application United Kingdom, Sep. 15, 1987, 8721647
Int. Cl.[5] A61K *31/365*; C07D *315/00*
U.S. Cl. 514—450 **6 Claims**

1. A compound having the formula:



(II)

wherein

R^2 is a C_3–C_8 straight or branched-chain alkyl, alkenyl or alkynyl group which may optionally contain an oxygen or sulphur atom as part of the chain, or a C_3–C_8 cycloalkyl or cycloalkenyl group;

R^4 is hydrogen or methyl; with the proviso that when R^2 is branched chain alkyl it is not isopropyl or 2-butyl.

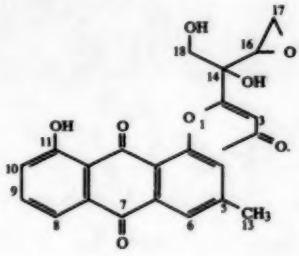
4,927,848

BU-3839T ANTIBIOTIC

Masataka Konishi, Kawasaki; Keiko Shimizu, Tokyo; Masaru Ohbayashi, Tokyo; Koji Tomita, Tokyo; Takeo Miyaki, and Toshikazu Oki, both of Yokohama, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Filed Sep. 19, 1988, Ser. No. 246,393
Int. Cl.[5] A61K *31/35*; C07D *311/78*
U.S. Cl. 514—453 **2 Claims**

1. The compound BU-3839T having the formula



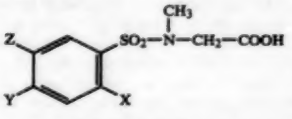
4,927,849

SULFONAMIDO DERIVATIVES INHIBITING THE ALDOSE REDUCTASE ENZYME SYSTEM AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Giulio Caccia, Viareggio, and Massimo Baldacci, Pisa, both of Italy, assignors to Laboratori Baldacci SpA, Pisa, Italy

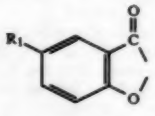
Filed Sep. 16, 1988, Ser. No. 245,165
Claims priority, application Italy, Sep. 16, 1987, 21930 A/87
Int. Cl.[5] A61K *31/35*; C07D *311/86*
U.S. Cl. 514—455 **7 Claims**

1. A sulfonamido derivative having the general formula:



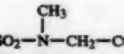
(I)

wherein X represents hydrogen, alkyl, alkoxy or halogen and Y and Z taken together form the group:



(II)

wherein R_1 is a halogen,



—COOH, —CO—CH_2—R_2 (where R_2 is an alkyl radical) or CF_3.

4,927,850

ANTIOXIDANT COMPOSITIONS AND METHODS FOR AMELIORATING INFLAMMATORY SYMPTOMS OF RESPIRATORY DISEASE

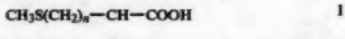
Robert K. Bayless, 6509 Pevensey Dr., Austin, Tex. 78745, and Gerald P. Hirsch, 8414 Hanbridge La., Austin, Tex. 78736

Filed Apr. 8, 1988, Ser. No. 179,230

Int. Cl.[5] A61K *31/20, 31/34, 31/195, 31/355*

U.S. Cl. 514—458 **10 Claims**

1. A method for ameliorating inflammatory symptoms of respiratory disease including but not limited to edema, adult respiratory distress syndrome, asbestosis, and asthma in a subject in need of such treatment, comprising administering to the subject an antioxidant in unit dosage form comprising active components consisting essentially of an antiinflammatory amount of at least one methionine compound selected from the group consisting of the methionine hydroxy analog, and methionine compounds having the structural formula I



I

dl- or d- form

and pharmaceutically acceptable N- (mono- and di- carboxylic acid) acyl derivatives and alkyl esters thereof, where n is an integer from 1 to 3, and an amount of a dietary antioxidant selected from the group consisting of vitamins A, C, and E, beta carotene, selenium, zinc and glutathionine and combinations thereof where such combination becomes therapeutically effective.

4,927,851

ANALOGS OF MEVALONOLACTONE AND DERIVATIVES THEREOF

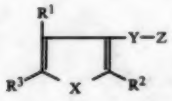
Robert E. Damon, II, Wharton, and James R. Wareing, Randolph, both of N.J., assignors to Sandoz Pharm. Corp., E. Hanover, N.J.

Continuation of Ser. No. 945,428, Dec. 22, 1986, Pat. No. 4,829,081, which is a continuation-in-part of Ser. No. 816,664, Jan. 7, 1986, abandoned. This application Sep. 12, 1988, Ser. No. 242,667

Int. Cl.[5] A61K *31/34, 31/38*

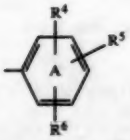
U.S. Cl. 514—460 **18 Claims**

1. A compound of the formula:



wherein

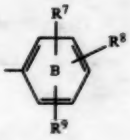
R^1 is C_{1-6}alkyl not containing an asymmetric carbon atom, C_{3-7}cycloalkyl or ring A



A

wherein R^4, R^5 and R^6 are as defined below,

R^2 is C_{1-6}alkyl not containing an asymmetric carbon atom, C_{3-7}cycloalkyl or ring B:



B

wherein R^7, R^8 and R^9 are as defined below,

R_3 is hydrogen, C_{1-6}alkyl not containing an asymmetric carbon atom, C_{3-7}cycloalkyl or ring C:

C

wherein R^{10}, R^{11} and R^{12} are as defined below;

Y is

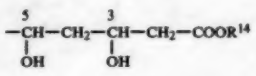
(a)

or

$-CH_2-CH_2-$; (b)

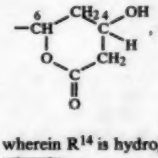
X is —O— or —S—;

Z is



(a)

or



(b)

wherein R^{14} is hydrogen, R^{15} or M,

wherein

R^{15} is a physiologically acceptable ester group, and

M is a pharmaceutically acceptable cation,

wherein

each of R^4, R^7 and R^{10} is independently hydrogen, C_{1-3}alkyl, n-butyl, i-butyl, t-butyl, C_{1-3}alkoxy, n-butoxy, i-butoxy, trifluoromethyl, fluoro, chloro, phenyl, phenoxy or benzyloxy,

each of R^5, R^8 and R^{11} is independently hydrogen, C_{1-3}alkyl, C_{1-3}alkoxy, trifluoromethyl, fluoro, chloro, phenoxy or benzyloxy, and

each of R^6, R^9 and R^{12} is independently hydrogen, C_{1-2}alkyl, C_{1-2}alkoxy, fluoro or chloro, with the provisos that not more than one substituent on each of Rings A, B and C; independently is trifluoromethyl, not more than one substituent on each of Rings A, B and C, independently is phenyoxy, and not more than one substituent on each of Rings A, B and C independently is benzyloxy with the proviso that when X is —S—, then Z is (b).

4,927,852

INSECTICIDAL COMPOUNDS CHARACTERIZED BY ENHANCED KNOCKDOWN EFFECT

Michael J. Robson, Bracknell; Peter J. V. Cleare, Ascot, and Mark A. Spinney, Wokingham, all of England, assignors to Imperial Chemical Industries PLC, London, United Kingdom

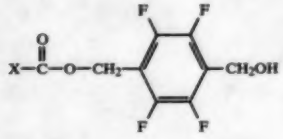
Filed Aug. 8, 1988, Ser. No. 229,532

Claims priority, application United Kingdom, Aug. 6, 1987, 8718620

Int. Cl.[5] C07C *69/743, 69/747, 69/74;* A01N *53/00*

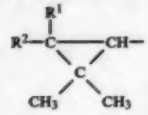
U.S. Cl. 514—531 6 Claims

1. An insecticidal composition, comprising an insecticidally effective amount of a compound of formula (I):

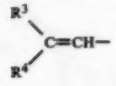


(I)

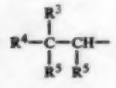
wherein X represents a group of formula:



where either (i) R^1 and R^2 are each selected from hydrogen, halo and alkyl of up to four carbon atoms, or (ii) R^1 is hydrogen and R^2 represents either a group of formula:



or a group of formula:



where R^3 and R^4 are each selected from hydrogen, methyl, halo and haloalkyl of one or two carbon atoms containing at least two fluorine atoms, and R^5 is selected from chloro and bromo, or a stereoisomer thereof, in combination with an insecticidally inert carrier or diluent.

4,927,853

COMPOSITION FOR INCREASING BLOOD PRESSURE

Richard J. Wurtman, Boston, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 665,579, Oct. 29, 1984, Pat. No. 4,745,130, which is a continuation of Ser. No. 366,887, Apr. 8, 1982, abandoned, which is a continuation-in-part of Ser. No. 88,226, Oct. 25, 1979, abandoned, which is a continuation of Ser. No. 898,740, Apr. 27, 1978, abandoned. This application Feb. 16, 1988, Ser. No. 156,109

Int. Cl.[5] A61K *31/05*

U.S. Cl. 514—567 3 Claims

1. A composition for increasing blood pressure comprising a mixture of (a) a composition selected from the group consisting of (1) phenylalanine and (2) a mixture of phenylalanine and tyrosine and (b) a blood pressure increasing agent selected form the group consisting of neosynephrine, calcium chloride, ephedrine, dopamine and norepinephrine in an amount effective to increase blood pressure wherein the dosage of said composition (a) is between about 5 and 200 mg/kg body weight.

4,927,854

SUSTAINED/ENHANCED ANALGESIA

Abraham Sunshine, New York, and Eugene M. Laska, Larchmont, both of N.Y., assignors to Analgesic Associates, Larchmont, N.Y.

Continuation of Ser. No. 137,866, Dec. 24, 1987, abandoned. This application Jul. 21, 1989, Ser. No. 384,101

Int. Cl.[5] A61K *31/19*

U.S. Cl. 514—570 41 Claims

1. The method of eliciting a sustained, enhanced analgesic response in a human mammal suffering from pain and in need of such treatment, comprising administering to such organism a unit dosage sustainedly enhancing, analgesically effective amount of the S(+) flurbiprofen enantiomer, and said enentiomer being substantially free of its R(−) flurbiprofen antipode.

4,927,855

LEVOROTATORY ISOMER OF BENZHYDRYLSULFINYL DERIVATIVES

Louis Lafon, Paris, France, assignor to Laboratoire L. Lafon, Maisons Alfort, France

Filed Jan. 28, 1987, Ser. No. 7,720

Claims priority, application France, Jan. 31, 1986, 86 01337

Int. Cl.[5] A61K *31/165;* C07C *147/14, 103.22*

U.S. Cl. 514—618 6 Claims

1. (−)-Benzhydrylsulfinylacetamide.

2. A method for the treatment of hypersomnia, which comprises administering, to a patient in need of such a treatment, an effective amount of a pharmaceutical composition consisting essentially of (−)-benzhydrylsulfinylacetamide as an arousing agent.

3. A method for the treatment of Alzheimer's disease, which comprises administering, to a patient in need of such a treatment, an effective amount of a pharmaceutical composition consisting essentially of (−)-benzhydrylsulfinylacetamide as a central nervous system stimulant.

4,927,856

PRODUCTION OF HYDROCARBONS FROM GEOTHERMAL RESOURCES

Glenn R. Elion, Chatham, Mass., assignor to International Communication & Energy, division of International Optical Telecommunications, Inc., Hyannis, Mass.

Filed Mar. 23, 1989, Ser. No. 327,643

Int. Cl.[5] C07C *27/06*

U.S. Cl. 518—702 13 Claims

1. A method for producing methanol from a gas mixture containing carbon dioxide emerging from a geopressurized resource, said method comprising:

(a) passing said gas mixture through a turbine to generate electricity;

(b) hydrolyzing water with electricity so generated to form hydrogen gas and oxygen gas; and

(c) reacting said hydrogen gas with said carbon dioxide in said gas mixture emerging from said turbine to form methanol.

4,927,857

METHOD OF METHANOL PRODUCTION

William T. McShea, III, Martinsville, and Robert M. Yarrington, Westfield, both of N.J., assignors to Engelhard Corporation, Edison, N.J.

Continuation of Ser. No. 430,452, Sep. 30, 1982, abandoned. This application Jan. 18, 1989, Ser. No. 298,875

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[5] C07C *27/06;* C01B *3/36*

U.S. Cl. 518—703 25 Claims

1. A process for the production of methanol from a hydrocarbonaceous feed, comprising the steps of:

(a) preheating an inlet stream comprising a hydrocarbonaceous feed, H_2O, and oxygen to a preheat temperature sufficiently high to initiate catalytic oxidation of said feed as defined below;

(b) introducing the preheated inlet stream into a first catalyst zone comprising a monolithic body having a plurality of gas flow passages extending therethrough and having a catalytically effective amount of palladium and platinum catalytic components dispersed therein, the amounts of feed, H_2O, and oxygen introduced into said first catalyst zone being controlled to maintain is said inlet stream an H_2O to C ratio of from about 0.5 to 3 and an O_2 to c ratio of from about 0.35 to 0.65;

(c) contacting the preheated inlet stream within said first catalyst zone with said palladium and platinum catalytic components to initiate and sustain therein catalytic oxidation of said feed to produce hydrogen and carbon oxides therefrom the temperature of at least about 250° F. (139° C.) greater than the ignition temperature of said inlet stream, and oxidizing in said first catalyst zone a quantity, less than all, of said feed, which quantity is sufficient to heat such first zone effluent to an elevated temperature high enough to catalytically steam reform, within a second catalyst zone defined below, hydrocarbon remaining is such first zone effluent without supplying external heat thereto;

(d) passing the first zone effluent, while still at an elevated temperature, from said first catalyst zone to a second catalyst zone containing a platinum group metal steam reforming catalyst therein, and contacting the first zone effluent is said second catalyst zone with said reforming catalyst to react hydrocarbons therein with H_2O to produce hydrogen and carbon oxides therefrom;

(e) withdrawing the effluent of said second catalyst zone as said hydrogen-rich synthesis gas and cooling said synthesis gas;

(f) passing said synthesis gas from step (e) to a methanol synthesis loop to react the hydrogen with carbon oxides thereof over a methanol synthesis catalyst at methanol synthesis conditions; and

(g) withdrawing methanol as product from said methanol synthesis loop.

4,927,858

POLYPHENYLENE ETHER-ALKENYL AROMATIC POLYMER BLENDS HAVING ORGANOBROMINE ADDITIVES

James M. Joyce, Chesapeake, and Donald J. Kelley, Suffolk, both of Va., assignors to Huntsman Chemical Corporation, Salt Lake City, Utah

Filed Jul. 10, 1989, Ser. No. 377,260

Int. Cl.[5] C08J *7/18*

U.S. Cl. 521—59 6 Claims

1. A method for the production of an expandable PPE/PS composition comprising: treating a PPE/PS blend with an organobromine; wherein said PPE/PS blend comprises (i) polyphenylene ether and (ii) alkenyl aromatic polymer; wherein the amount of polyphenylene ether is within the range of about 2 weight percent to about 98 weight percent; wherein said weight percentages are based upon the total weight of polyphenylene ether and alkenyl aromatic polymer; wherein said organobromine is selected from the group consisting of: (i) tetrabromocyclooctane, (ii) hexabromocyclododecane, (iii) tetrabromovinylcyclohexene, (iv) bis(allyl ether) of tetrabromobisphenol A, and (v) any combination thereof; and wherein the amount of said organobromine is an amount sufficient to reduce said PPE/PS composition's mold cool time.

4,927,859

EXPANDABLE POLYMERS IN PARTICLE FORM

Heinz Weber, Gruenstadt; Eckhard Nintz, Ludwigshafen; Manfred Walter, Speyer; Dieter Ballweber, Frankenthal, and Bertram Ostermayer, Roedersheim-Gronau, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 19, 1989, Ser. No. 354,230

Claims priority, application Fed. Rep. of Germany, May 25, 1988, 3817631

Int. Cl.[5] C08J *9/18*

U.S. Cl. 521—59 4 Claims

1. An expandable polymer in particle form, containing

(a) from 20 to 94.9% by weight of a styrene polymer,

(b) from 0.1 to 75% by weight of a polyphenylene ether,

(c) from 5 to 20% by weight of a blowing agent mixture consisting of

(c1) aliphatic or cycloaliphatic saturated hydrocarbons of 3 to 7 carbon atoms and

(c2) an aromatic saturated hydrocarbon of 7 or 8 carbon atoms,

an alcohol of 2 to 4 carbon atoms,

a ketone of 3 to 5 carbon atoms,

a cyclic ether of 4 to 6 carbon atoms,

an aliphatic ether of 4 to 6 carbon atoms,

an ester of 4 to 6 carbon atoms and/or a chlorohydrocarbon of 1 or 2 carbon atoms and 2 or 3 chlorine atoms in a weight ratio of c1:c2 of from 50:1 to 1:1, with or without

(d) conventional additives in effective amounts.

4,927,860

POLYAMIDE POWDER FORMED BY PARTICLES HAVING A GYPSUM ROSE STRUCTURE AND PROCESS FOR PREPARING SUCH POWDER

Jean C. Hilaire, and Roland Guerin, both of Pau, France, assignors to Atochem, Paris, France

Division of Ser. No. 217,557, Jul. 11, 1988, Pat. No. 4,831,066. This application Dec. 27, 1988, Ser. No. 289,519

Claims priority, application France, Aug. 11, 1987, 8711422

Int. Cl.[5] C08J *9/28*

U.S. Cl. 521—60 10 Claims

1. A polyamide powder consisting essentially of elementary porous particles having a "gypsum rose" structure wherein the particles have a lamellar structure whose lamellae, which are connected to each other, form cavities varying in geometric shape between a conical shape and a pyramidal shape, the apices of these geometric shapes being directed toward the centers of the particles.

4,927,861

RIGID POLYURETHANE PREPARATION PROCESS

Sadario O. Souto, Sao Caetano do Sul, and Wilson G. De Moura, Sao Paulo, both of Brazil, assignors to Brastemp S/A, Sao Bernardo Do Campo, Brazil

Continuation of Ser. No. 164,927, Mar. 7, 1988, abandoned. This application Feb. 10, 1989, Ser. No. 309,916
Claims priority, application Brazil, Mar. 11, 1987, 8701098
Int. Cl.[5] C08G 18/14
U.S. Cl. 521—99 9 Claims

1. Process for the preparation of rigid, cellular, high density polyurethane, comprising:

reacting a resin including at least one polyether polyol and at least one polyester polyol in an amount of 5 to 100 parts by weight of resin, said polyether polyol derived from sucrose and propylene oxide, each of said polyols having a molecular weight of between 100 and 5,000, a hydroxyl number of between 30 and 500 and a viscosity of between 100 and 10,000 centipoise, with 90 to 150 parts by weight of resin of an aromatic polyisocyanate selected from the group consisting of toluene diisocyanate and diphenylmethane diisocyanate, said aromatic polyisocyanate having a viscosity of between 8 and 1000 centipoise and having an NCO percentage of 30 to 40, said rigid polyurethane having an elongation of between 2 and 50%, a density of between 0.20 to I.30 g/cm3 and an NCO/OH ratio of between 0.60 and 2.20.

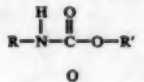
4,927,862

PROCESS FOR THE PREPARATION OF A POLYURETHANE FROM A STORAGE STABLE POLYOL COMPOSITIONS

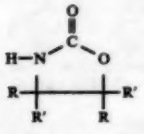
Timothy A. Tufts, Columbus, Ohio, assignor to Ashland Oil, Inc., Russell, Ky.

Division of Ser. No. 71,236, Jul. 7, 1987, abandoned. This application May 1, 1989, Ser. No. 330,585
Int. Cl.[5] C08G 18/30
U.S. Cl. 521—118 5 Claims

1. In a process for the preparation of a polyurethane by reaction of an organic polyisocyanate and a blend comprising a long chain polyol and a short chain diol, said blend phase separating under storage, the improvement which comprises incorporating into said blend a compatibilizing amount of a urethane corresponding to Formula I or II



I



II

wherein R and R' independently represent an alkyl group having from 1 to 20 carbon atoms, an aryl group having from 6 to 12 carbon atoms, an alkyaryl group having from 7 to 20 carbon atoms, hydroxyl, hydroxyalkyl or hydroxyaryl and using said compatibilized blend for forming said polyurethane.

4,927,863

PROCESS FOR PRODUCING CLOSED-CELL POLYURETHANE FOAM COMPOSITIONS EXPANDED WITH MIXTURES OF BLOWING AGENTS

Philip L. Bartlett, and Joseph A. Creazzo, both of Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 158,442, Feb. 2, 1988, abandoned. This application Sep. 18, 1989, Ser. No. 408,393
Int. Cl.[5] C08J 9/00
U.S. Cl. 521—131 9 Claims

1. A process comprising

mixing at least 1 wt. percent to 59 wt. percent of a shrinkage-minimizing halocarbon selected from the group consisting of CFC-11, CFC-12, HCFC-22, HFC-32, CFC-113, CFC-114, HCFC-124, HCFC-133*a*, HFC-134*a*, HCFC-142*b* and HFC-152*a*, and 99 to 41 wt. percent of a two-carbon hydrogen-containing halocarbon selected from the group consisting of HCFC-123, HCFC-123*a* and HCFC-141*b*, to form a mixture, and, thereafter,

using the mixture to produce a minimal shrinkage closed-cell polyurethane foam.

4,927,864

USE OF A POLYAMINE AS CELL OPENER IN POLYURETHANE FOAM

Kurt C. Frisch, Jr., Fridley, Minn., and Robert F. Harris, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 31, 1989, Ser. No. 304,750
Int. Cl.[5] C08G 18/14
U.S. Cl. 521—163 22 Claims

1. An open-celled polyisocyanate-based polymer the preparation of which comprises reacting in the presence of a blowing agent,

(a) an organic polyisocyanate,

(b) at least one polyfunctional isocyanate-reactive component, and

(c) from about 0.1 to about 15 percent by weight, relative to the amount of (b), of a cell opener which comprises a polyamine containing at least two terminal amine moieties, at least three polyalkyleneoxy moieties and at least two aminocarbonyl or aminothiocarbonyl moieties selected from the group consisting of urea, amide, biuret, thiourea, thioamide and dithiobiuret, or mixtures thereof provided that each aminocarbonyl or aminothiocarbonyl moiety is separated from each terminal amine moiety by at least one polyalkyleneoxy moiety.

4,927,865

ANTHRAQUINOYLCARBOXYLIC ACID HYDRAZIDES, CURABLE COMPOSITIONS AND USE THEREOF

Rudolf Duthaler, Bettingen, Switzerland; Jürgen Finter, Freiburg, Fed. Rep. of Germany; Walter Fischer, Reinach, and Visvanathan Ramanathan, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

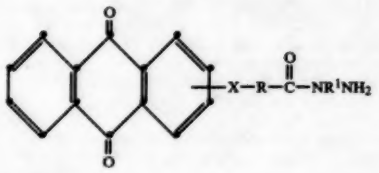
Division of Ser. No. 208,522, Jun. 20, 1988, Pat. No. 4,855,094. This application May 12, 1989, Ser. No. 350,863
Claims priority, application Switzerland, Jul. 1, 1987, 2484/87
Int. Cl.[5] C08G 2/00; G03C 1/68; C07C 50/18
U.S. Cl. 522—48 9 Claims

1. A curable composition comprising

(a) at least one epoxy resin with an average of more than one epoxy group in the molecule,

(b) an epoxy resin hardener if necessary,

(c) at least one anthraquinone of formula I



(I)

wherein X is the group $—CR^2R^3—$, where R^2 is H, —CN or C_1–C_5-alkyl and R^3 is H or —CN, R^1 is H or C_1–C_5-alkyl and R is a direct bond or linear or branched C_1–C_{18}-alkylene which, alone or together with the $—CR^2R^3—$ group, can be interrupted by one or more —O— when R^2 and/or R^3 are not —CN, it being possible for the group -X-R- additionally to be a direct bond, and

(d) at least one primary or secondary aliphatic amine containing at least one hydroxyl group in the aliphatic radical.

4,927,866

SHAPABLE MATERIAL AND SHAPED ARTICLES OBTAINABLE THEREFROM

Robert Purrmann, Starnberg; Rainer Guggenberger, Hechendorf, and Gunter Pieper, Seefeld, all of Fed. Rep. of Germany, assignors to ESPE Stiftung & Co. Produktions- und Vertriebs KG, Seefeld, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 316,946

Claims priority, application Fed. Rep. of Germany, Feb. 29, 1988, 3806448

Int. Cl.[5] A61K *6/08*

U.S. Cl. 523—115 **22 Claims**

1. A shapable material comprising:

(a) an aluminum fluorosilicate glass;

(b) at least one polycarboxylic acid having an average molecular weight greater than 500;

(c) a carbonate and/or hydrogen carbonate in an amount of at least 0.1% by weight, based on (a);

(d) optionally a chelating agent; and

(e) optionally water.

4,927,867

PROCESS FOR THE MANUFACTURE OF AN IMPACT-RESISTANT THERMOPLASTIC RESIN

Philippe Heim, and Gerard Riess, both of Mulhouse, France, assignors to Norsolor, Cedex, France

Filed Aug. 19, 1988, Ser. No. 234,052

Claims priority, application France, Aug. 20, 1987, 87 11758

Int. Cl.[5] C08J *3/00*

U.S. Cl. 523—339 **14 Claims**

1. A process for the manufacture of an impact resistant thermoplastic resin modified with an elastomeric latex, comprising the steps of:

(a) preparing the elastomeric latex in an aqueous emulsion from at least one ethylenically unsaturated monomer in the presence of an ionic surfactant;

(b) adding at least one vinyl monomer to the elastomeric latex from step (a), said vinyl monomer being insoluble or substantially insoluble in water, and adding a transfer agent having a charge opposite to that of the surfactant employed in step (a) to transfer the particles of the elastomeric latex into the vinyl monomer; and

(c) polymerizing the vinyl monomer from step (b).

4,927,868

HIGH SOLIDS COATING COMPOSITIONS CONTAINING A POLYEPOXIDE AND A COPOLYMER OF AN ALPHA-OLEFIN AND AN OLEFINICALLY UNSATURATED MONOANHYDRIDE

Karl F. Schimmel, Verona, and William P. Blackburn, Evans City, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 19, 1987, Ser. No. 87,012

Int. Cl.[5] C08L *63/02, 33/08;* **C08K** *5/07*

U.S. Cl. 523—439 **13 Claims**

1. A curable, liquid coating composition containing organic solvent and a resinous binder, said resinous binder comprising:

(a) a polyepoxide,

(b) a copolymer of an alpha-olefin or a cycloolefin and an olefinically unsaturated monoanhydride including a partial ester thereof; and

(c) a carboxy-terminated polyester polyacid curing agent containing at least two carboxyl groups per molecule;

said coating composition having a resin solids content of at least 40 percent by weight.

4,927,869

CHEMICALLY TREATED GLASS FIBERS FOR REINFORCING POLYMERS

David E. Dana, Pittsburgh, and Steven J. Morris, Freeport, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 15, 1988, Ser. No. 245,099

Int. Cl.[5] C08K *3/20*

U.S. Cl. 523—502 **28 Claims**

1. An aqueous chemical treating composition for fibrous inorganic oxide surfaces, comprising:

a. two film forming polymers selected from water soluble, emulsifiable, or dispersible unsaturated, essentially linear polyester and from water soluble, emulsifiable, or dispersible vinyl acetate copolymer having low solubility in acetone selected from the group consisting of vinyl acetate-organo silane copolymer, and vinyl acetate-methylolacrylamide copolymer, where the two polymers are present as the only film forming polymers and present in a combined amount in the range of around 1 to 30 weight percent of the aqueous composition as an effective film forming polymeric amount, wherein the vinyl acetate copolymer is present in a predominant amount of the two film forming polymers,

b. acryloxy alkyltrialkoxy silane coupling agent selected from the group consisting of unhdyrolyzed silane, partially hydrolyzed and fully hydrolyzed derivatives thereof and mixtures thereof present in an effective coupling agent amount, and

c. polyester polymer curing agent selected from internal and external thermal oxidative curing agents in an effective amount to cure the polyester to less than its full extent,

d. fiber lubricant selected from the group consisting of nonionic, water soluble polyethylene-containing polymer and cationic lubricants selected from the group consisting of polyalkylene polyamine, polyamino amide and partially amidated polyalkyleneimines and mixtures thereof in an effective lubricating amount,

e. silylated polyazamide present in an amount ranging from 0 when the polyethylene-containing polymer is the fiber lubricant to an effective fuzz reducing amount when the cationic lubricant is the fiber lubricant, and

f. water present in an effective amount to give a total solids content for the aqueous chemical treating composition ranging from around 1 to around 30 weight percent.

4,927,870

IGNITION RESISTANT MODIFIED THERMOPLASTIC COMPOSITION

Samuel A. Ogoe, Angleton, and Thoi H. Ho, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 25, 1988, Ser. No. 236,706
Int. Cl.[5] C08K 5/52, 3/24
U.S. Cl. 524—140 11 Claims

1. An ignition resistant non-haloaromatic thermoplastic composition consisting essentially of

(A) a member of the group consisting of
(i) a non-carbonate thermoplastic polymer,
(ii) a carbonate polymer, and
(iii) a blend of A and B,

(B) 0.001 to 20% by weight of a high elastic memory polytetrafluoroethylene having a heat shrinkage equal to or greater than 15%,

(C) 0.1 to 30% by weight of an organic phosphate, and

(D) 0.001 to 10% by weight of a metal salt of an inorganic acid.

4,927,871

PROCESS FOR PRODUCING MODIFIED ULTRAHIGH-MOLECULAR-WEIGHT POLYOLEFINS

Yoshiji Ohori, and Hirofumi Harazoe, both of Waki, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Jul. 15, 1988, Ser. No. 219,574
Claims priority, application Japan, Jul. 17, 1987, 62-177227
Int. Cl.[5] C08K 5/37, 5/20, 5/11, 5/07
U.S. Cl. 524—230 18 Claims

1. A process for producing a modified ultrahigh-molecular-weight polyolefin composition, which comprises mixing a powder of an ultrahigh-molecular-weight polyolefin (A) having an intrinsic viscosity [η] of at least 5 dl/g, a flowability improver (B) having a melting point lower than the melting point of the ultrahigh-molecular-weight polyolefin (A), a monomer (C) having an olefinically unsaturated bond and a radical initiator (D) with stirring at the melting point of the flowability improver (B) or a higher temperature but below the melting point of the ultrahigh-molecular-weight polyolefin (A), and then melt-kneading them at the melting point of the ultrahigh-molecular-weight polyolefin (A) or a higher temperature to react the monomer (C) with the ultrahigh-molecular-weight polyolefin (A).

4,927,872

POLYPROPYLENE FILM

Masahiro Kakugo, Narashino, and Seiichiro Ima, Ichihara, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Division of Ser. No. 45,433, May 4, 1987, Pat. No. 4,839,234. This application Apr. 3, 1989, Ser. No. 331,759
Claims priority, application Japan, May 13, 1986, 61-110231; Jun. 11, 1986, 61-135593
Int. Cl.[5] C08J 5/20
U.S. Cl. 524—232 5 Claims

1. A polypropylene film obtained by the melt extrusion from a composition comprising 100 parts by weight of a crystalline polypropylene and, incorporated therein, a slipping agent [A] having a melting point of 100° to 125° C. and a slipping agent [B] having a melting point of 70° to 90° C., the weight ratio of the slipping agent [A] to the slipping agent [B] being in the range of 0.2 to 20, in a total mount of 0.05 to 1.0 part by weight, the initial coefficient of friction of said film being 0.7 or below and the coefficient of friction after heating at 60° C. being 1.0 or below.

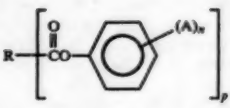
4,927,873

HALOPHENYL ESTER FLAME RETARDANTS FOR POLYPHENYLENE ETHER RESINS

Joseph M. Bohen, King of Prussia, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Mar. 25, 1988, Ser. No. 173,516
Int. Cl.[5] C08K 5/10, 5/11, 5/12
U.S. Cl. 524—288 14 Claims

1. A flame retardant composition comprising a polyphenylene ether resin and an amount of an ester effective to increase the flame retardancy of said resin, said ester having the formula:



wherein:

(a) R is a substituted or unsubstituted hydrocarbon radical of 1–30 carbons, in which said substituents are selected from aryl or substituted aryl, Cl, Br, OH,

in which R^1 is a 1–22 carbon alkyl or aryl which may optionally be substituted by Cl or Br;

(b) A is Br or Cl;

(c) n is an integer of 3 to 5; and

(d) p is an integer of 1 to 4.

4,927,874

BENEFICIATED TALCS

Kenneth E. Weber, Pacific Palisades, Calif., assignor to Cyprus Mines Corporation, Englewood, Colo.

Division of Ser. No. 70,940, Jul. 8, 1987, Pat. No. 4,814,019, Continuation-in-part of Ser. No. 3,242, Jan. 14, 1987, Pat. No. 4,820,347. This application Sep. 23, 1988, Ser. No. 247,928
Int. Cl.[5] C08K 5/06
U.S. Cl. 524—375 17 Claims

1. A moldable thermoplastic resinous composition comprising:

(A) A beneficiated talc hitherto regarded as suitable for use as a filler for thermoplastic resinous compositions comprising a talc which, when ground to an approximately 2.5–5.0 μm median particle size, exhibits a wet powder brightness of at least about 30%, admixed with an effective amount of:

(a) one or a mixture of octyl- or nonylphenol/poly(ethylene oxide) condensates, and

(b) one or a mixture of poly(ethylene glycols) or alkoxypoly(ethylene glycols); and

(B) a moldable thermoplastic resin.

4,927,875

METHOD FOR PREPARING ACRYLIC/POLYESTER RESIN

Rudolf Masika, Pittsburgh, and William A. Emary, Freeport, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 102,209, Sep. 29, 1987. This application Nov. 29, 1989, Ser. No. 442,748
Int. Cl.[5] C08L 67/06
U.S. Cl. 524—457 9 Claims

1. A method for preparing a water-borne resin composition comprising:

(A) addition polymerizing in solution in the presence of a free-radical polymerization initiator, a first monomer composition essentially free of ethylenically unsaturated

monomers having functional groups substantially reactive with epoxy groups, said first monomer composition containing from 1 to 15 percent by weight of an epoxy-functional vinyl monomer and from 99 to 85 percent by weight of at least one other copolymerizable vinyl monomer in the presence of a polyester polymer having an acid value on solids of from 10 to 95 and a weight average molecular weight of from 500 to 2,000 until the epoxy functionality of said epoxy-functional vinyl monomer has been essentially completely reacted, to form a first product (1) wherein the vinyl portion of said first product (1) is hydrophobic, and thereafter

(B) addition polymerizing in solution in said first product (1) in the presence of a free-radical polymerization initiator, a second monomer composition containing from 3 to 50 percent by weight, based on the total weight of vinyl monomers from parts (A) and (B), of an ethylenically unsaturated carboxylic acid and at least one other copolymerizable vinyl monomer different from said epoxy-functional vinyl monomer, to form a second product (2), wherein the addition polymerizations of steps (A) and (B) above are conducted in the presence of at most a limited amount of an organic solvent, and thereafter

(C) dispersing said product (2) in water utilizing a neutralizing agent selected from the group consisting of ammonia, an organic base or a mixture thereof.

4,927,876

AQUEOUS DISPERSIONS

Richard G. Coogan, North Reading, and Razmik Vartan-Boghossian, Belmont, both of Mass., assignors to ICI Americas Inc., Wilmington, Del.

Filed Sep. 14, 1988, Ser. No. 244,385

Claims priority, application United Kingdom, Sep. 14, 1987, 8721536

Int. Cl.[5] C08L *75/04, 33/06*

U.S. Cl. 524—457 **16 Claims**

1. An aqueous polymer dispersion containing a water-dispersible polyurethane and a vinyl polymer, the polyurethane being the product of reacting an active hydrogen containing chain extender with a water-dispersible isocyanate-terminated polyurethane derived from a polyisocyanate component comprising a mixture of the 2,4'- and 4,4'-isomers of diphenylmethane diisocyanate containing from 5 to 70% by weight of the 2,4'-isomer.

4,927,877

AIR-DRYING NON-WATER-DISPERSIBLE RESIN COMPOSITION

Terukazu Shibata, Yokohama; Nobushige Numa, Ebina, and Masafumi Kawamura, Hiratsuka, all of Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan

Filed Apr. 7, 1989, Ser. No. 334,550

Claims priority, application Japan, Apr. 12, 1988, 63-89352

Int. Cl.[5] C08L *67/08*

U.S. Cl. 525—7 **15 Claims**

1. An air-drying non-water-dispersible resin composition obtained by dispersion-polymerization of at least one vinyllic unsaturated monomer (C) in the presence of a vinyllic graft alkyd resin (I) as a dispersion stabilizer in an organic solvent in which at least a part of the vinyllic graft alkyd resin (I) is soluble, the vinyllic unsaturated monomer (C) is substantially soluble but the resulting polymer gells are substantially insoluble, wherein the vinyllic graft alkyd resin (I) is obtained by graft copolymerizing 10 to 70% by weight of a modified alkyd resin (A) having an oil length in the range of 30 to 80% obtained by modification with at least one material selected from drying oils, semi-drying oils, drying oil fatty acids and semi-drying oil fatty acids with 90 to 30% by weight of at least one vinyllic monomer (B) at least 30% of the vinyl monomer (B) being composed of a vinyllic unsaturated monomer (B-1) having an SP value of not greater than 8.25 and a glass transition temperature of at least 20 1 ° C.

4,927,878

HEAT-CURABLE COMPOSITIONS COMPRISING A MIXTURE OF BIS(2-HYDROXYETHYL) DICYCLOPENTADIENE-CONTAINING POLYESTERS AND UNSATURATED POLYESTERS

Jerome L. Stavinoha, and Anthony W. McCollum, both of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 101,473, Sep. 28, 1987, Pat. No. 4,801,629. This application Oct. 25, 1988, Ser. No. 262,373

Int. Cl.[5] C08L *67/06*

U.S. Cl. 525—44 **1 Claim**

1. An article coated by a process which comprises:

(a) providing a solution containing:

(i) a film or fiber forming polyester comprising recurring units of the formula:

wherein R is an aliphatic or aromatic group; and

(ii) an unsaturated polyester;

(b) applying a coat of the solution onto an article;

(c) removing the solvent; and

(d) heating to cure the coating.

4,927,879

METHOD FOR SOLID PHASE MEMBRANE MIMETICS

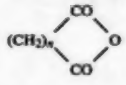
Charles Pidgeon, West Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

Continuation-in-part of Ser. No. 160,196, Feb. 25, 1988. This application Oct. 24, 1988, Ser. No. 261,502

Int. Cl.[5] A61K *37/02;* C08G *283/00;* C08L *89/00*

U.S. Cl. 525—54.1 **1 Claim**

1. A method for forming a membrane mimetic structure on a surface having covalently bound nucleophilic functional groups, said structure having a hydrophilic outer portion and a hydrophobic inner portion and consisting essentially of a monomolecular layer of adjacent amphiphilic molecules independently covalently bound to said surface through at least a portion of the nucleophilic functional groups, said method comprising the step of contacting said surface with a cyclic dicarboxylic anhydride of the formula



wherein n is an integer from 8 to 14,

said step being conducted under conditions conducive to the reaction of the nucleophilic group and said cyclic anhydride, said reaction being conducted until the covalently bound amphiphilic molecules sterically hinder further reaction with the nucleophilic groups on the surface.

4,927,880

LOW GLOSS MOLDED ARTICLES USING POLYORGANOSILOXANE/POLYVINYL-BASED GRAFT POLYMERS

James L. DeRudder, Mt. Vernon, Ind.; Herman Savenije, Bergen op Zoom, Netherlands, and I-Chung W. Wang, Williamstown, Mass., assignors to General Electric Company, Parkersburg, W. Va.

Filed Nov. 14, 1988, Ser. No. 271,222
Int. Cl.[5] C08L 51/08
U.S. Cl. 525—63 **40 Claims**

1. An extruded, molded or heat formed article having a flatted surface comprising:

(A) a thermoplastic polymer resin selected from an aromatic polycarbonate; a polyester carbonate; an aromatic dihydric phenyl sulfone carbonate polymer; a polyester resin prepared by reacting units of an aliphatic diol, a cycloaliphatic diol or a mixture of such diols, and an aromatic diacid; a poly(etherimide ester) elastomer; a vinyl aromatic polymer; a polyphenylene ether; or a mixture of any of the foregoing; and

an effective, flatting amount of a flatting agent comprising a multi-stage polyorganosiloxane/polyvinyl-based graft polymer composition (B) comprising:

(a) as a first stage, a substrate selected from

(i) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer and at least one vinyl-based polymer;

(ii) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer, at least one vinyl-based polymer, and units which are derived from a cross linking agent or agents;

(iii) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer, at least one vinyl-based polymer, and units which serve as a graft-linking agent or agents;

(iv) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer, at least one vinyl-based polymer, units which are derived from a cross-linking agent or agents and units from the same or different agent or agents which serve as a graft-linking agent or agents; or

(v) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer, at least one vinyl-based polymer, and a mixture of any of units which are derived from a crosslinking agent or agents, units which serve as a graft-linking agent or agents, or units derived from a cross-linking agent or agents and units from the same or different agent or agents which serve as a graft-linking agent or agents; and

(b) at least one subsequent stage or stages graft polymerized in the presence of any previous stages and which is comprised of a vinyl-based polymer or a cross-linked vinyl-based polymer, the outermost stage being comprised of a vinyl aromatic-based polymer or a cross-linked vinyl aromatic-based polymer.

4,927,881

SOLVENT-RESISTANT, COMPATIBLE POLYPHENYLENE ETHER-THERMOPLASTIC POLYESTER BLENDS CONTAINING LARGE PROPORTIONS OF POLYCARBONATE

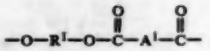
Sterling B. Brown, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 18, 1988, Ser. No. 182,691
The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.
Int. Cl.[5] C08L 53/02, 71/12
U.S. Cl. 525—92 **15 Claims**

1. A composition comprising the following resinous components and any reaction products thereof, all percentage proportions being by weight of total resinous components:

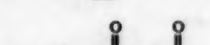
(A) about 15–40% of at least one polyphenylene ether containing at most 800 ppm. of unneutralized amino nitrogen;

(B) about 15–35% of at least one polyester selected from the group consisting of (B-1) those consisting essentially of structural units of the formulas



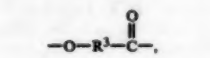
(I)

and



(II)

wherein R^1 is a saturated C_{2-10} divalent aliphatic or alicyclic hydrocarbon radical, R^2 is a saturated C_{2-4} divalent aliphatic hydrocarbon radical, A^1 is a divalent aromatic radical containing about 6–20 carbon atoms and x has an average value of at least 10; (B-2) those consisting essentially of units of formula I and units of the formula



(III)

wherein R^3 is a C_{3-6} saturated divalent aliphatic hydrocarbon radical; and blends of at least one of components B-1 and B-2 with (B-3) polyesters consisting essentially of units of formula I;

(C) about 5–20% of at least one polyphenylene ether-compatible impact modifier; and

(D) about 20–40% of at least one polymer containing a substantial proportion of aromatic polycarbonate units and having a weight average molecular weight of at least about 40,000 as determined by gel permeation chromatography relative to polystyrene.

4,927,882

SBR THERMOPLASTIC ELASTOMER

Ghawamedin Bayan, West Chester, Pa., assignor to The West Company, Incorporated, Phoenixville, Pa.

Filed Oct. 11, 1988, Ser. No. 255,498
Int. Cl.[5] C08L 23/26, 9/06, 53/02, 23/12
U.S. Cl. 525—99 **9 Claims**

1. A thermoplastic elastomer comprising a composition having a compression set less than about 30% and produced by dynamic vulcanization of SBR to form a dispersed phase of cross-linked SBR in a co-continuous matrix of SEBS and polypropylene.

4,927,883

PROCESS FOR THE PREPARATION OF CROSSLINKED POLY β-ALANINE IN THE FORM OF MICROSPHERES

Claudine Lapoiriere, Le Perreux; Claude Mahieu, Paris, and Christos Papantoniou, Montmorency, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Filed Dec. 13, 1988, Ser. No. 283,960
Claims priority, application France, Dec. 16, 1987, 87 17573
Int. Cl.[5] C08L 61/00
U.S. Cl. 525—154 **4 Claims**

1. A process for preparing crosslinked poly β- alanine in the form of microspheres having a low size dispersity comprising

(a) polymerizing acrylamide in a tert. butanol/toluene solvent mixture, wherein the ratio of tert. butanol to toluene ranges from 1.24 to 10:1, in the presence of a polymerization initiator and an octadecene-maleic anhydride copolymer as a suspension agent;

(b) submitting the resulting suspension of poly β- alanine microspheres to a crosslinking reaction using a dialdehyde as the crosslinking agent; and

(c) isolating the resulting crosslinked poly β- alanine microspheres.

4,927,884

CURABLE COMPOSITION

Nsozumi Iwasawa, Hiratsuka; Osamu Isozaki, Yokohama, and Noboru Naksi, Hiratsuka, all of Japan, assignors to Kansai Paint Co., Limited, Amagasaki, Japan

Filed Nov. 9, 1988, Ser. No. 269,084
Claims priority, application Japan, Nov. 12, 1987, 62-285859; Nov. 12, 1987, 62-287106
Int. Cl.[5] C08F 8/00
U.S. Cl. 525—195 13 Claims

1. A curable composition characterized in that the composition consists essentially of:

(i) 100 parts by weight of a polymer mixture consisting essentially of

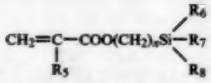
(a) about 5 to about 95% by weight of a polymer (X) containing a polysiloxane macromonomer as an essential monomer or a polymer (Y) containing an alkoxysilane-containing vinyl monomer as an essential monomer, and

(b) about 95 to about 5% by weight of a polymer (Z) containing an epoxy-containing vinyl monomer as an essential monomer,

the polysiloxane macromonomer being prepared by reacting about 70 to about 99.999 mole % of a compound (A) represented by the formula

(I)

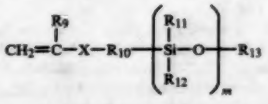
wherein R_1 is an aliphatic hydrocarbon group having 1 to 8 carbon atoms or phenyl, and R_2, R_3 and R_4 are each alkoxyl having 1 to 4 carbon atoms or hydroxyl with about 30 to about 0.001 mole % of a compound (B) represented by the formula



(II)

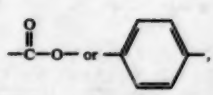
wherein R_5 is a hydrogen atom or methyl, R_6, R_7 and R_8 are each hydroxyl, alkoxyl having 1 to 4 carbon atoms or an aliphatic hydrocarbon group having 1 to 8 carbon atoms, at least one of R_6, R_7 and R_8 being hydroxyl or alkoxyl, and n is an integer of 1 to 6, the polysiloxane macromonomer having per molecule at least two functional groups selected from hydroxyl and alkoxyl and being about 400 to about 100000 in number average molecular weight,

the alkoxysilane-containing vinyl monomer being represented by the formula



(III)

wherein X is



R_9 is a hydrogen atom or methyl, R_{10} is a bivalent saturated aliphatic hydrocarbon group having 1 to 6 carbon atoms, R_{11} and R_{12} are the same or different and are each phenyl, alkyl having 1 to 6 carbon atoms or alkoxyl having 1 to 6 carbon atoms, R_{13} is alkyl having 1 to 6 carbon atoms, and m is an integer of from 1 to 10; and

(ii) about 0.01 to about 30 parts by weight of at least one chelate compound selected from the group consisting of aluminum chelate compound, titanium chelate compound and zirconium chelate compound.

4,927,885

POLYPROPYLENE RESIN COMPOSITIONS

Suetou Hayashida, Noda; Kyoichiro Kimura, Ichihara, and Eiji Takahashi, Chiba, all of Japan, assignors to Maruzen Petrochemical Co., Ltd., Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,847
Claims priority, application Japan, Oct. 14, 1987, 62-257382
Int. Cl.[5] C08L 23/12, 45/00, 25/08
U.S. Cl. 525—211 18 Claims

1. A polypropylene resin composition for manufacture of polypropylene film having excellent transparency comprising:

(A) 70 to 99 parts by weight of stereospecific polypropylene and

(B) 1 to 30 parts by weight of a hydrogenated resin, said hydrogenated resin being obtained by hydrogenation of a thermally copolymerized resin prepared from 1 mole of cyclopentadienes and 0.06 to 0.6 mole of one or more kinds of aromatic hydrocarbons selected from the group consisting of monovinyl aromatic hydrocarbons and indenes, wherein (a) said thermally copolymerized resin contained norbornene units (ND) and cyclopentene units (CD), both derived from cyclopentadiene units contained in said thermally copolymerized resin, in a ratio (ND/CD) of not higher than 0.55, and (b) the degree of hydrogenation of said hydrogenated resin is not less than 98.0%.

4,927,886

LOW INHERENT VISCOSITY-HIGH GLASS TRANSITION TEMPERATURE ENHANCING AGENTS PRODUCED BY MASS REACTION POLYMERIZATION AS AN OVERPOLYMER ON POLYVINYL CHLORIDE RESINS

Richard H. Backderf, Richfield, and Frank J. Donat, Mantua, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 14, 1987, Ser. No. 85,668
Int. Cl.[5] C08F 8/34, 14/06
U.S. Cl. 525—261 8 Claims

1. A low inherent viscosity-high glass transition temperature treated polyvinyl chloride resin comprising:

a polyvinyl chloride resin and a polyvinyl chloride high glass transition temperature-inherent viscosity enhancing agent, said glass transition temperature-inherent viscosity enhancing agent applied to said polyvinyl chloride resin by mass overpolymerization on and within said polyvinyl chloride resin being one or more high glass transition temperature agent forming monomers and an effective amount of one or more chain transfer agents so that the inherent viscosity of said treated polyvinyl chloride resin is reduced, said chain transfer agent being a mercaptan alcohol having from 2 to 22 carbon atoms, or H_2S gas, the amount of said polyvinyl chloride resin being from about 50 parts to about 2,000 parts by weight for every 100 parts

by weight of said one or more glass transition temperature agent forming monomers.

4,927,887

MODIFIED RUBBER COMPOSITIONS CONTAINING AROMATIC SIX-MEMBERED HETEROCYCLIC NITROGEN-CONTAINING GROUPS

David P. Tate, Akron, and Daniel F. Graves, Clinton, both of Ohio, assignors to Bridgestone/Firestone, Inc., Akron, Ohio

Continuation of Ser. No. 653,657, Sep. 21, 1984, abandoned. This application Aug. 19, 1988, Ser. No. 234,105

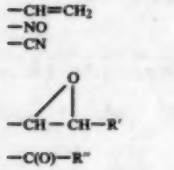
Int. Cl.[5] C08F 8/20

U.S. Cl. 525—279 16 Claims

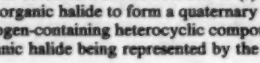
1. An uncured rubber composition prepared by reacting

(a) at least one polymer rubber containing carbon-carbon unsaturation and an alkali metal chemically bonded to the polymer rubber, with

(b-2) at least one aromatic six-membered heterocyclic nitrogen-containing compound substituted with a group containing no active hydrogen which can react with the alkali metal of said rubber but said group is reacted with the alkali metal of the polymer rubber, said nitrogen-containing compound being a substituted quinoline, pyridine, pyridazine, pyraziune or pyrimidine compound, the substituent on said nitrogen-containing compound being one of the following groups



where R′ is H or an alkyl or aryl group, and R″ is hydrogen, alkyl, aryl, or a pyridyl group, and thereafter reacting the rubber obtained from the reaction of (a) and (b-2) with at least one organic halide to form a quaternary ammonium salt of the nitrogen-containing heterocyclic compound in the rubber, said organic halide being represented by the formula



(II)

wherein

Ar is an aromatic group,

X is a halogen,

a is a number from 1 to 3,

b is equal to 3-c,

c is a number from 1 to 3, and

a+b+c equals 4.

4,927,888

MALEIC ANHYDRIDE GRAFT COPOLYMERS HAVING LOW YELLOWNESS INDEX AND FILMS CONTAINING THE SAME

Chad A. Strait; Ricky L. Tabor, both of Lake Jackson, and Gerald M. Lancaster, Freeport, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 905,099, Sep. 5, 1986, Pat. No. 4,762,890. This application Aug. 5, 1988, Ser. No. 229,078

The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

Int. Cl.[5] C08F 255/02, 283/00

U.S. Cl. 525—285 22 Claims

1. A graft copolymer comprising the reaction product of maleic anhydride and a backbone polymer which has a yellowness index as measured according to ASTM D-1925 of less than 10.0 and wherein between 0.50 and 2.0 weight percent of said graft copolymer comprises maleic anhydride and further wherein said backbone polymer is selected from the group consisting of polyolefins, linear copolymers of ethylene and carbon monoxide and copolymers of ethylene and ethylenically unsaturated carboxylic acids or derivatives thereof.

4,927,889

MODIFIED BLOCK COPOLYMER AND A PROCESS FOR PRODUCING THE SAME

Toshinori Shiraki, Yamato; Fusakazu Hayano, Chigasaki, and Hideo Morita, Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 847,257, Apr. 2, 1986, Pat. No. 4,820,768. This application Oct. 27, 1987, Ser. No. 113,238

Claims priority, application Japan, Aug. 13, 1981, 56-125882; Aug. 24, 1981, 56-131650

Int. Cl.[5] C08F 257/02, 279/02, 297/04

U.S. Cl. 525—285 32 Claims

1. A modified block copolymer comprising a linear base block copolymer of at least two monovinyl substituted aromatic hydrocarbon polymer blocks and at least one olefin compound polymer block having an ethylenic unsaturation degree not exceeding 20%, said linear base block copolymer having at least one maleic anhydride unit radically grafted thereonto, said linear base block copolymer having a monovinyl substituted aromatic hydrocarbon content of 5 to 95% by weight.

4,927,890

SYNTHESIS OF BIGRAFT COPOLYMERS BASED ON GRAFTED TYPE PERACID POLYMER

Ging-Ho Hsiue, and Wen-Kuei Huang, both of Hsinchu, Taiwan, assignors to National Science Council, Taipei, Taiwan

Filed Sep. 23, 1988, Ser. No. 248,034

Int. Cl.[5] C08F 255/02, 265/02

U.S. Cl. 525—301 15 Claims

1. A process of preparing a bigraft copolymer substrate having a form of a membrane, particulate or tube comprising

(a) graft polymerizing a first ethylenically unsaturated monomer containing a carboxyl acid group onto a polymer substrate having a form of a membrane, particulate or tube;

(b) oxidizing the carboxyl acid groups of the resulting graft polymer into percarboxyl acid groups; and

(c) graft polymerizing a second ethylenically unsaturated monomer onto the grafted chain of the graft polymer through the decomposition of the percarboxyl acid.

4,927,891

POLYMER BOUND LIGHT STABILIZER COATING RESINS

Vasanth R. Kamath, Amherst, and James D. Sargent, Cheektowaga, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Nov. 23, 1988, Ser. No. 275,452

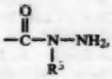
Int. Cl.[5] C08F 8/30

U.S. Cl. 525—327.3 9 Claims

1. A light stabilized acrylic resin comprising the reaction product of

an acrylic prepolymer having at least first and second types of reactive functional groups, the first type of reactive functional group being a hydroxyalkyl ester group, the second type of reactive functional group being a carboxyl group, an anhydride group, an epoxy group or an isocyanate group, and

at least one light stabilizer having a reactive hydrazido group, the light stabilizer being 2,2,6,6-tetraalkylpiperidine hydrazide, 2-(2-hydroxyphenyl)-2H-benzotriazole hydrazide, 2-hydroxybenzophenone hydrazide, aryl salicylate hydrazide or oxanilide hydrazide, the reactive hydrazido group having a formula



in which R^3 is hydrogen, primary alkyl of 1 to 8 carbons, secondary alkyl of 3 to 8 carbons, aralkyl of 7 to 12 carbons or cycloalkyl of 5 to 12 carbons.

4,927,892

PROCESS FOR THE PREPARATION OF FUNCTIONALIZED POLYMERS

Eit Drent, and Antonius A. Broekhuis, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 11, 1988, Ser. No. 255,232

Claims priority, application United Kingdom, Oct. 14, 1987, 8724108

Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—340 9 Claims

1. A process for the preparation of a functionalized polymer comprising reacting a polymer of a conjugated diene hydrocarbon or copolymer of a conjugated diene hydrocarbon and a vinyl aromatic compound, at least part of said polymer or copolymer being formed by 1,2-polymerization of the conjugated diene hydrocarbon, with (a) carbon monoxide and (b) water and/or an alcohol, in the presence of a catalytic system prepared by combining (i) a salt of divalent palladium, (ii) a phosphine ligand which has the general formula A

(A)

in which R^1, R^2 and R^3 each represent an optionally substituted aryl group and (iii) an acid, except hydrohalogenic acids wherein the acid has a non-co-ordinating anoin and a pk_a below 2, measured at 18° C. in aqueous solution, and is not a carboxylic acid.

4,927,893

PROCESS FOR PRODUCING METHACRYLIMIDE GROUP-CONTAINING POLYMER

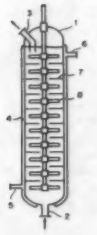
Hisao Anzai; Hideaki Makino, both of Ohtake; Masami Ootani, Kuga; Isao Sasaki, Ohno, and Kozi Nishida, Toyama, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,436

Claims priority, application Japan, Oct. 31, 1988, 63-275292

Int. Cl.[5] C08F *8/32*

U.S. Cl. 525—378 3 Claims



1. In a process for producing continuously a methacrylimide group-containing polymer by adding a compound represented by the following formula:

$$R—NH_2$$

wherein R represents H, an alkyl group having 1 to 12 carbon atoms, a cycloalkyl group having 7 to 11 carbon atoms, or an aryl group having 6 to 10 carbon atoms, to a methacrylic polymer in the presence of a solvent, and carrying out the imidization reaction, the improvement which comprises feeding raw materials for said reaction from one end part of a reactor and removing liquid mixture that finished the reaction from other part of the reactor positioned above the one end part.

4,927,894

METHOD FOR PREPARATION OF ARYLOXYTRIAZINE-CAPPED POLYPHENYLENE ETHERS

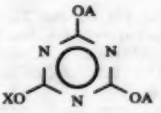
Sterling B. Brown, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 21, 1989, Ser. No. 369,153

Int. Cl.[5] C08G *30/08, 65/48*

U.S. Cl. 525—390 11 Claims

1. A method for preparing an aryloxytriazine-capped polyphenylene ether composition which comprises contacting under reactive conditions, in the presence of a basic reagent, at least one polyphenylene ether with an aryl cyanurate of the formula



(I)

wherein A is an unsubstituted or substituted aromatic radical and X is an alkyl or cycloalkyl or an unsubstituted or substituted aromatic radical.

4,927,895

SILICON-CONTAINING COPOLYESTER AND METHOD OF PRODUCING THE SAME

Toshio Nakane; Kenji Hijikata; Yukihiko Kageyama, and Katsuhiko Takahashi, all of Shizuoka, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 121,263, Nov. 16, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 263,698

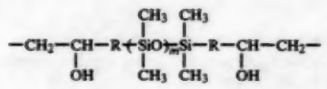
Claims priority, application Japan, May 28, 1988, 61-273518

Int. Cl.[5] C08F *20/00*

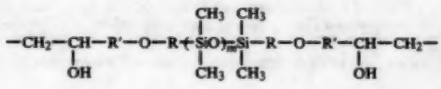
U.S. Cl. 525—438 14 Claims

1. A silicon-containing copolyester in the form of a block copolymer which consists essentially of:

(i) between about 1 to 99% by weight of a siloxane segment which is at least one selected from the group consisting of siloxane segments expressed by the following general formulas:

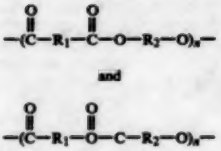


and



where R and R', which may be the same or different, are each hydrocarbon moieties having 1 to 10 carbon atoms, and m is an integer between 1 to 2000; and

(ii) between about 99 to about 1% by weight of a polyester segment which is at least one selected from polyester segments of the following general formulas:



and

where R_1 is at least one radical selected from the group consisting of aromatic bivalent radicals having 6 to 12 carbon atoms and aliphatic bivalent radicals having 4 to 20 carbon atoms, R_2 is at least one radical selected from the group consisting of aromatic bivalent radicals having 6 to 20 carbon atoms, and aliphatic bivalent radicals having 2 to 20 carbon atoms, and n is an integer between 1 and 1000.

4,927,896

PROCESS FOR POLYMERIZING MONOALLYLAMINE

Wesley C. Blocker; David N. Roark, and Edwin D. Hornbaker, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 148,907, Jan. 27, 1988, abandoned, which is a continuation-in-part of Ser. No. 855,940, Apr. 25, 1986, abandoned. This application Jul. 3, 1989, Ser. No. 375,034

Int. Cl.[5] C08F 2/16, 26/02

U.S. Cl. 526—93 **18 Claims**

1. A process which comprises polymerizing a monomer charge consisting essentially of 80–100% by weight of a water-soluble salt of monoallylamine and 0–20% by weight of one or more copolymerizable allyl amine comonomers in an aqueous reaction medium at a temperature of about 30–80° C. in the presence of a polymerization initiator comprising about 5–10% by weight of hydrogen peroxide and about 1–700 ppm of a multivalent metal ion, based on the weight of the monomer charge.

4,927,897

METAL-CONTAINING ORGANIC POLYMER AND USE THEREOF

Ken Kawata; Kozo Sato, and Masayoshi Tsuboi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 1, 1988, Ser. No. 214,062

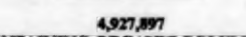
Claims priority, application Japan, Jul. 2, 1987, 62-166116

Int. Cl.[5] C08F 38/00

U.S. Cl. 526—240 **24 Claims**

1. A catalyst film for nonelectrode plating comprising a polymer produced by the step of polymerizing

(1) a compound represented by formula (I):



(I)

wherein

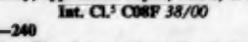
S represents a polyoxyether group, a polyaminoether group, or a polythioether group;

L represents a chemical bond or a group having a valency of (k+m);

l, k and m each represents an integer of 1 or more, and

R represents a Group IB metal atom or a Group VIII atom; or

(2) a mixture of (a) a compound represented by formula (I):



(I)

wherein

S, L, l, k and m have the same meaning as defined above; and

R represents a carboxyl group of a hydrogen atom; and

(b) a salt or a Group IB metal atom or a Group VIII metal

4,927,898

POLYSILOXANES WITH STERICALLY HINDERED HETEROCYCLIC MOIETY

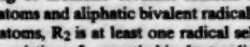
Roswell King, III, Pleasantville, N.Y.; George N. Foster, Bloomsbury, N.J., and Herbert E. Petty, Bethel, Conn., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Sep. 6, 1988, Ser. No. 240,505

Int. Cl.[5] C08G 77/04

U.S. Cl. 528—27 **31 Claims**

1. A polysiloxane of the formula:



(I)

wherein:

M* represents a member of the group M,M' or M" in which

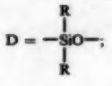
M=R^a_3SiO —;

M'=R^a_3Si—;

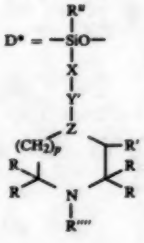
M"=$R''O_{\frac{1}{2}}$—;

R^a is an alkyl group having from 1 to about 8 carbon atoms, phenyl or phenethyl;

R" is an alkyl group having from 2 to about 40 carbon atoms or a phenyl group;

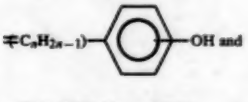


R is phenyl or an alkyl group having from 1 to 3 carbon atoms;



R' is hydrogen, an alkyl group having from 1 to 3 carbon atoms or a keto oxygen;

X is a valence bond or a divalent linkage selected from the group consisting of $—C_nH_{2n}—$, $—C_nH_{2n}OC_mH_{2m}—$,



$—C_nH_{2n}O(C_mH_{2m-1}{\mp}OH$;

R"" is hydrogen or an alkyl group having from 1 to about 12 carbon atoms;

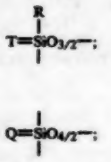
Y' is —O—, —COO—, $—C_nH_{2n}O—$ or —NH—;

Z is carbon or nitrogen, with the proviso that when z is nitrogen Y' is $—C_nH_{2n}O—$

n has a value of from zero to about 10;

m has a value of from zero to about 10;

p has a value of zero or one;



v has a value of 1;
x has a value of from zero to about 200;
y has a value of from 1 to about 100;
z has a value of from zero to about 5;
w has a value of from zero to about 5.

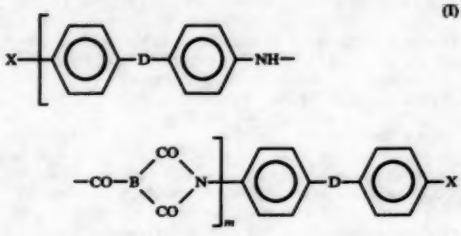
4,927,899

ALKENYLOXYLATED AROMATIC POLYAMIDOIMIDES

Philippe Michaud, Villeurbanne, and Yves Camberlin, Caluire, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

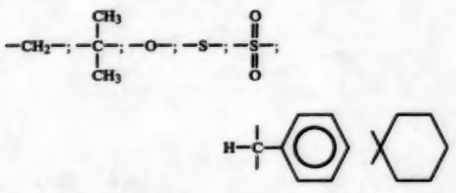
Filed Mar. 24, 1989, Ser. No. 328,240
Claims priority, application France, Mar. 24, 1988, 88 04136
Int. Cl.[5] C08G 18/34
U.S. Cl. 528—49 **11 Claims**

1. A linear aromatic polyamidoimide having alkenyloxy end groups and having the following general formula:

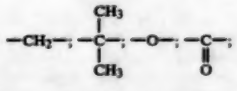


(I)

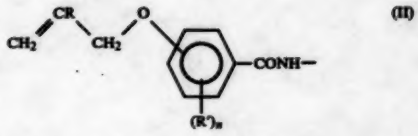
in which each of the symbols D, which are identical, is a single valence bond or one of the groups:



the symbol B is a trivalent radical comprising an aromatic radical containing at least 6 carbon atoms, substituted or unsubstituted, or of two such radicals linked together by a single valence bond or one of the groups:



the symbol m is the average number of recurring structural units and is at least equal to 1; and each of the symbols X, which are identical, is a radical of the formula:



(II)

in which R is a hydrogen atom or a methyl radical; the (meth-)allyloxy radical is in an ortho, meta or para position relative to the carbon atom of the benzene ring which is linked to the CONH group; R' is a methyl radical; and n is an integer equal to 0, 1, 2 or 3.

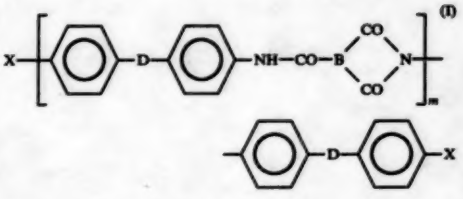
4,927,900

AROMATIC POLYAMIDOIMIDES HAVING MALEIMIDO END GROUPS

Philippe Michaud, Villeurbanne, and Yves Camberlin, Caluire, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

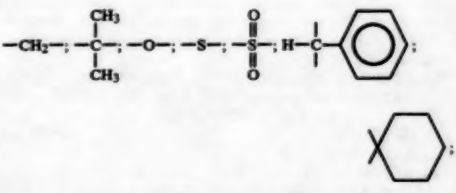
Filed Mar. 24, 1989, Ser. No. 328,506
Claims priority, application France, Mar. 24, 1988, 88 04137
Int. Cl.[5] C08G 18/34
U.S. Cl. 528—49 **11 Claims**

1. A linear aromatic polyamidoimide having maleimido end groups and having the following general formula:

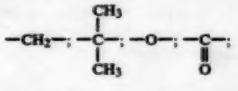


(I)

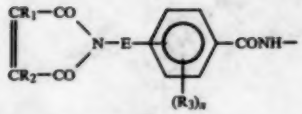
in which each of the symbols D, which are identical, is a single valence bond or one of the groups:



the symbol B is a trivalent radical comprising an aromatic radical containing at least 6 carbon atoms, substituted or unsubstituted, or of two such radicals linked together by a single valence bond or one of the groups:



the symbol m is the average number of recurring structural units and is at least equal to 1; and each of the symbols X, which are identical, is a radical of the formula:



(II)

in which each of the symbols R_1, R_2, which may be identical or different, is a hydrogen atom or a methyl radical; the symbol R_3 is a methyl radical; n is an integer equal to 0, 1, 2 or 3; and the symbol E is a single valence bond or a $—CH_2—$ group and is in an ortho, meta or para position relative to the carbon atom of the benzene ring which is linked to the CONH group.

4,927,901

CURABLE POLYURETHANE CASTING SYSTEMS AND AMINE HARDENERS THEREFOR

Teruko Miyazaki, Okemos, Mich., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 21, 1988, Ser. No. 274,081
Int. Cl.[5] C08B *18/32*
U.S. Cl. 528—64 10 Claims

1. A curable polyurethane casting system comprising

(a) an amine hardener comprising diethyltoluenediamine or t-butyl-metatoluenediamine and 4,4'-methylene-bis-ortho-ethylaniliine in a mole ratio of from about 99:1 to about 1:99;

(b) isocyanate terminated polymers of polyisocyanates and (c)polyols.

4,927,902

POLYTHIOLS AND USE AS EPOXY RESIN CURING AGENTS

Granais S. Johnson, Maplewood; Reuben H. Grinstein, Denville; Stuart J. Hartman, Livingston, and Raymond P. Dallago, Highland Park, all of N.J., assignors to Henkel Corporation, Ambler, Pa.

Division of Ser. No. 156,692, Feb. 17, 1988, Pat. No. 4,879,414. This application Aug. 29, 1989, Ser. No. 400,057
Int. Cl.[5] C08G *59/66*
U.S. Cl. 528—99 23 Claims

1. A curable epoxy resin comprising:

(a) at least one polyepoxide and

(b) at least one polythiol having the structure:

$$(XSCH_2CHOHCH_2)_b\text{-}A\text{-}R\text{-}N(CH_2COHOHCH_2SX)_2$$

wherein:

R is aromatic, substituted aromatic, methylene bis-diphenyl, xylylene, cycloaliphatic, substituted cycloaliphatic, methylene bisdicyclohexyl, dimethylene cyclohexyl, methylene cyclohexyl or aliphatic,

A is N or 0

X is -H or -R'SH,

R' is alkylene, cycloalkylene or alkylene substituted aromatic, and

when A is 0, b is 1 and when A is N, b is 2.

4,927,903

DIPHENOL MONOESTERS OF CARBOXYLIC ACIDS, A PROCESS FOR THEIR PREPARATION, THEIR USE FOR THE PREPARATION OF POLYESTER-CARBONATES, THE POLYESTER-CARBONATES OBTAINABLE ACCORDING TO THE INVENTION AND FLAME-REPELLENT MOULDING COMPOSITIONS

Manfred Schreckenberg; Rolf Dhein; Hans Rudolph, and Nouvertné Werner, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Continuation of Ser. No. 616,341, Jun. 1, 1984, abandoned. This application May 9, 1986, Ser. No. 861,768
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1983, 3320260
Int. Cl.[5] C08J *5/49*
U.S. Cl. 528—176 5 Claims

1. A process for the production of a diphenol monoester of carboxylic acid comprising reacting one or more carboxylic acid with one or more high-molecular weight polycarbonate using 0.001 to 10% relative to the weight of said acid and said polycarbonate of a catalyst selected from the group consisting of 5-membered heterocyclic compounds, amidines, salts of tertiary organic amines, trialkyl ammonium hydroxide, tetraalkyl ammonium hydroxide, and oxides, hydroxides, alcoholates, carbonates, sulphonates, and phosphonates, of alkali metals at a temperature between 150° C. and 350° C., CO_2 being split off, in which one diphenol polycarbonate equivalent is employed per carboxylic acid group of the carboxylic acid employed.

4,927,904

METHOD FOR PREPARING CYCLIC POLYARYLATE OLIGOMERS

Thomas L. Guggenheim, Scotia; Sharon J. McCormick, Clifton Park, and Alice M. Colley, Latham, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 12, 1989, Ser. No. 364,294
Int. Cl.[5] C08G *63/30, 63/27*
U.S. Cl. 528—182 11 Claims

1. A method for preparing a cyclic polyarylate oligomer composition which comprises simultaneously introducing the following into a solution in a substantially water-immiscible organic liquid of (C) a catalytic amount of at least one quaternary ammonium salt having a single alkyl group containing about 8–20 carbon atoms and having not more than 5 additional carbon atoms:

a freshly prepared solution in a substantially water-immiscible organic liquid of (A) at least one halide of an aromatic dicarboxylic acid in which the carboxy groups are not attached to adjacent carbon atoms, and

a freshly prepared aqueous solution of (B) at least one water-soluble salt of a dihydroxyaromatic compound,

the amount of reagent B being at least about 3% in excess of stoichiometric.

4,927,905

PROCESS FOR THE PRODUCTION OF AROMATIC HYDROXYL-CONTAINING COMPOUND-HYDROCARBON RESINS

Gary W. Bogan, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 14, 1988, Ser. No. 270,564
Int. Cl.[5] C08G *83/00*
U.S. Cl. 528—205 12 Claims

1. In a process for the preparation of hydrocarbon-aromatic hydroxyl-containing compound resins wherein an unsaturated hydrocarbon or mixture of unsaturated hydrocarbons are reacted with an aromatic hydroxyl-containing compound or mixture of such compounds in the presence of a Lewis acid and subsequently removing the unreacted aromatic hydroxyl-containing compound therefrom: the improvement which comprises neutralizing the Lewis acid with an inorganic base prior

to recovery of unreacted aromatic hydroxyl-containing compound without removing the salts formed as a result of the catalyst neutralization.

4,927,906

NOVEL POLYAMIDEIMIDE POLYMERS

Pen C. Wang, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 15, 1988, Ser. No. 284,872
Int. Cl.[5] C08G 12/00, 69/26, 63/08
U.S. Cl. 528—228 36 Claims

1. The process of producing a polyamideimide polymer by contacting under polymerization conditions

(a) a spirodilactam precursor of up to 30 carbon atoms inclusive selected from (1) 4-oxoheptanedioic acid compounds or (2) 1,6-dioxa-[4.4]spirodilactone,

(b) a primary diamine of up to 30 carton atoms wherein the amino groups are not located on adjacent carbon atoms, and

(c) an aromatic tricarboxylic acid compound of up to 30 carbon atoms and up to 3 aromatic rings, inclusive, having two of the acid groups located on adjacent carbon atoms of the same aromatic ring as free carboxyl groups or together as an anhydride moiety.

4,927,907

BISBENZOCYCLOBUTENE/BISIMIDE/FREE RADICAL POLYMERIZATION INHIBITOR COMPOSITION

Larry S. Corley, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed May 30, 1989, Ser. No. 358,742
Int. Cl.[5] C08G 73/12
U.S. Cl. 528—322 38 Claims

1. A composition comprising

(a) a difunctional bisimide of an unsaturated dicarboxylic acid;

(b) from about 0.6 to about 2.5 moles, per mole of the difunctional bisimide, of a bisbenzocyclobutene; and

(c) a free radical polymerization inhibitor for the bisimide.

4,927,908

CURABLE RESIN COMPOSITION COMPRISING CYANATO ARYL SPIRODILACTAM

Pen C. Wang, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 23, 1989, Ser. No. 314,519
Int. Cl.[5] C08G 69/14
U.S. Cl. 528—323 22 Claims

1. A curable thermosetting resin composition comprising (a) a cyanatoaryl-substituted 1,6-diaza[4.4]spirodilactam having a cyanatoaryl-containing substituent on each spiro ring mitrogen atom and (b) at least one additional polymerizable monomer of up to 30 carbon atoms inclusive having at least two functional substituents in the molecule with multiple bonds between adjacent atoms.

4,927,909

FABRICATION OF HIGH PERFORMANCE POLYBENZIMIDAZOLE FILMS

Lachhman Wadhwa, North Plainfield; Michel Bitritto, Summit, both of N.J., and Edward J. Powers, Charlotte, N.C., assignors to Hoechst Celanese Corp., Somerville, N.J.

Filed Sep. 18, 1987, Ser. No. 98,440
Int. Cl.[5] C08G 73/18; B29C 39/14, 67/22
U.S. Cl. 528—331 27 Claims

1. A continuous process for the preparation of a continuous polybenzimidazole film comprising:

(a) preparing a polybenzimidazole solution;

(b) continuously depositing the polybenzimidazole solution upon a support to form a wet film; held at a temperature in the range of about 40° C. to about a 125° C.

(c) passing the wet film and the support into an oven to remove a sufficient amount of solvent to form a self-supporting film;

(d) removing the film from the support; and

(e) continuously collecting the continuous film.

27. The film produced in accordance with the process of claim 1 or 2.

4,927,910

PREPARATION OF LINEAR POLYCARBONATES FROM CYCLIC OLIGOMER COMPOSITIONS USING ARYL TETRAHYDROPYRANYL ETHER CATALYST

Kevin R. Stewart, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 22, 1989, Ser. No. 313,564
Int. Cl.[5] C08G 63/62
U.S. Cl. 528—371 16 Claims

1. A method for preparing a resinous composition which comprises contacting, at a temperature in the range of about 200°–350° C., at least one cyclic polycarbonate oligomer with a catalytic amount of at least one aryl tetrahydropyranyl ether.

4,927,911

PREPARATION OF LINEAR POLYCARBONATES FROM CYCLIC OLIGOMER COMPOSITIONS USING ZWITTERIONIC CATALYST

Kevin R. Stewart, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 22, 1989, Ser. No. 313,563
Int. Cl.[5] C08G 63/62
U.S. Cl. 528—371 16 Claims

1. A method for preparing a resinous composition which comprises contacting, at a temperature in the range of about 200°–350° C., at least one cyclic polycarbonate oligomer with a catalytic amount of at least one zwitterionic compound containing positively charged nitrogen and negatively charged oxygen.

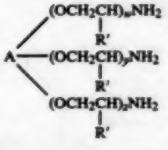
4,927,912

SECONDARY ISOPROPYL AMINES DERIVED FROM OXYALKYLENE TRIAMINES

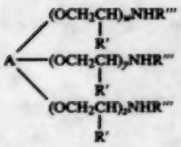
George P. Speranza, Austin; Jiang-Jen Lin, Houston, and James H. Templeton, Austin, all of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Continuation-in-part of Ser. No. 135,798, Dec. 21, 1987, Pat. No. 4,843,688. This application Mar. 13, 1989, Ser. No. 322,020
Int. Cl.[5] C08G 65/32
U.S. Cl. 528—405 4 Claims

1. An N-isopropyl secondary triamino derivative of an oxyalkylene triamine having the formula:



said isopropyl N-secondary triamino derivative having the formula:



(VI)

wherein A represents the nucleus of a 3 to 6 carbon atom oxyalkylation susceptible trihydric alcohol, w, y and z are integers with an average value sufficient to impart an average molecular weight of about 100 to 400 to the triamine starting material, R' represents hydrogen or a methyl group, at least one of R''' represents an isopropyl group and the remainder of R''' represent hydrogen or isopropyl groups.

4,927,913

CURED PRODUCT FROM THERMOSETTABLE PREPOLYMER PREPARED FROM HETEROCYCLIC MATERIALS HAVING ALKYL SUBSTITUENTS, MONO- OR DIANHYDRIDES, ETHYLENICALLY UNSATURATED MATERIALS AND A HYDROXIDE, CARBONATE OR BICARBONATE OF A METAL OF GROUPS I-A OR II-A

Duane S. Treybig, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 142,984, Jan. 12, 1988, Pat. No. 4,847,355, which is a continuation-in-part of Ser. No. 754,696, Jul. 15, 1985, abandoned. This application Mar. 3, 1989, Ser. No. 318,777

Int. Cl.[5] C08G *83/00*

U.S. Cl. 528—480 **9 Claims**

1. A cured product resulting from subjecting to conditions suitable for curing a thermosettable prepolymer prepared by reacting

(A) the reaction product of

(1) a heterocyclic material having one or more rings therein, at least one nitrogen atom in a ring and at least two substituent groups which have at least one reactive hydrogen atom attached to a carbon atom which is attached to a heterocyclic ring;

(2) a cycloaliphatic or aromatic carboxylic acid mono- or dianhydride; and

(3) a compound containing both a polymerizable ethylenically unsaturated group and at least one group selected from

(a) a heterocyclic material having one or more rings, at least one nitrogen atom in a ring and at least one substituent group which has at least one reactive hydrogen atom attached to a carbon atom which is attached to a heterocyclic ring or

(b) a cycloaliphatic or aromatic carboxylic acid mono- or dianhydride group; with

(B) an aqueous or alcoholic solution of a hydroxide, carbonate or bicarbonate of a metal of groups I-A or II-A; and wherein the components of (A) are employed in a molar ratio of (1):(2):(3) of from about 1:0.25:0.25 to about 1:4:4, respectively and components A and B are present in quantities which are sufficient to react at least a portion of either the anhydride, lactone, or combination of both anhydride and lactone groups present in component (A) with component (B).

4,927,914

POLYCARBONATE CROSS-LINKER RESIN AND FIRE RESISTANT COMPOSITIONS MADE THEREFROM

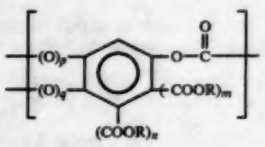
Niles R. Rosenquist, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 7, 1988, Ser. No. 280,847

Int. Cl.[5] C08G *63/62*

U.S. Cl. 528—480 **3 Claims**

1. A cross-linked polycarbonate resin composition prepared by a process which comprises the thermolytic degradation of the polycarbonate resin containing at least one chain moiety of the formula:



(II)

wherein m, n, p and q are each whole number integers of from 0 to 1 and the sum of m plus n is one and the sum of p plus q is one; and R is selected from the group consisting of hydrocarbyl and halogen-substituted hydrocarbyl amenable to beta-elimination upon thermal degradation;

4,927,915

PROCESS FOR PRODUCING ANTISTATIC POLYMERIC MATERIAL

Saburo Hiraoka; Shinji Hama, both of Kasugai, and Mitsuo Senga, Nagoya, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Oct. 6, 1988, Ser. No. 254,196

Claims priority, application Japan, Oct. 6, 1987, 62-252236; Nov. 4, 1987, 62-277394; Nov. 16, 1987, 62-288965; Nov. 24, 1987, 62-295479

Int. Cl.[5] C08F *6/00*; C08J *3/00*

U.S. Cl. 528—490 **4 Claims**

1. A process for producing an antistatic polymeric material which comprises heat-treating a polymeric material at a temperature of 60° C. to 140° C. moistened with an aqueous solution containing 0.5 to 5% by weight stannic chloride and 5 to 20% by weight of an inorganic acid salt selected from the group consisting of chlorides other than stannic chloride and nitrates.

4,927,916

METHOD OF PRODUCING FIBRIN-SPECIFIC MONOCLONAL ANTIBODIES LACKING FIBRINOGEN-CROSS-REACTIVITY USING FIBRIN-SPECIFIC PEPTIDES

Gary R. Matsueda, Winchester; Edgar Haber, Weston, and Kwan Hui, Brighton, all of Mass., assignors to The General Hospital Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 603,155, Apr. 23, 1984, abandoned. This application Jan. 30, 1986, Ser. No. 824,228

Int. Cl.[5] C07K *15/14*; A61K *39/395*; I07K *15/04*; C12N *35/00*

U.S. Cl. 530—387 **3 Claims**

1. A process for producing monoclonal anti-fibrin specific antibodies, devoid of cross reactivity with fibrinogen comprising:

a. obtaining lymphocytes from a animal immunized against the peptide fragment comprising

A-B-C-D-E-F-G

attached to a suitable immunogenic carrier, wherein

A is glycine;

B is histidine or proline;

C is arginine;

D is proline or valine;

E is aspartic acid or glutamic acid;

G is lysine or arginine;

b. fusing said lymphocytes with a meyloma cell line to produce hydridomas which secrete anti-fibrin specific antibodies substantially devoid of fibrinogen cross-reactivity;

c. cultivating said hybridomas; and

d. isolating said secreted antibodies.

4,927,917

QUASI-LIQUID CRYSTALS

Valeri A. Kronganz, and Felix P. Shvartsman, Rehovot, Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

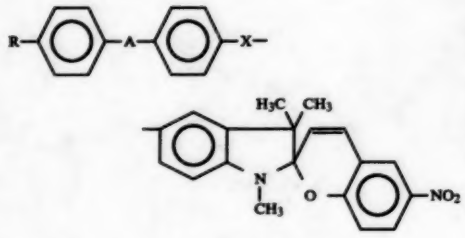
Continuation of Ser. No. 659,819, Oct. 10, 1984, abandoned. This application Dec. 19, 1988, Ser. No. 287,501

Claims priority, application Israel, Oct. 10, 1983, 69939

Int. Cl.[5] G02B 5/23; C09K 19/34, 19/54; C07D 491/107

U.S. Cl. 534—567 **5 Claims**

1. A quasi-liquid crystal-forming compound of the formula:



wherein,

X and A independently represent: —HC=N—; —ON=N—; —N=N—; —COO—; —HC=CH—; or —C≡C—;

R represents —OR'; —R'; —CN; —Cl; —F; —NO_2; —NR"$_2$; —R"; or —OR"; and

R' represents a straight chain alkyl radical and R" is a branched alkyl or alkenyl radical.

4,927,918

ANTIPARASITIC AGENTS

Bernard J. Banks, Margate, and Michael J. Witty, Dover, both of England, assignors to Pfizer Inc., New York, N.Y.

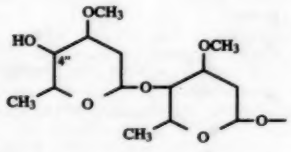
Filed Apr. 11, 1989, Ser. No. 336,400

Claims priority, application United Kingdom, Apr. 19, 1988, 8809232

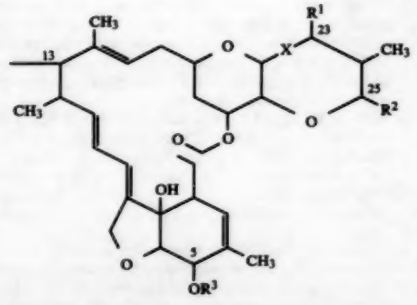
Int. Cl.[5] C07H 17/08

U.S. Cl. 536—7.1 **17 Claims**

1. A compound of formula (I):



(I)



wherein X represents a single or a double bond; R^1 is H or OH; provided that when X is a single bond, R^1 is H or OH, and when X is a double bond, R^1 is absent;

R^2 is a C_1–C_6 alkyl group substituted by one oxo or one or more hydroxy groups or by a single oxygen atom on two adjacent carbon atoms to form an oxirane ring, or R^2 is a C_1–C_5 alkyl group substituted by a (C_1–C_6 alkoxy) carbonyl group, said substituents on R_2 being attached to either or both a terminal carbon atom and a carbon atom adjacent to a terminal carbon atom of R^2; and R^3 is H or CH_3; or, when R^2 is substituted by oxo, a (C_1–C_4 alkyl) acetal or ketal derivative thereof.

4,927,919

CHARTREUSIN DERIVATIVES AND SALTS THEREOF

Nobutoshi Yamada; Hideo Sugi, and Kenji Kon, all of Moriyama, Japan, assignors to Ishihara Sangyo Kaisha, Ltd., Osaka, Japan

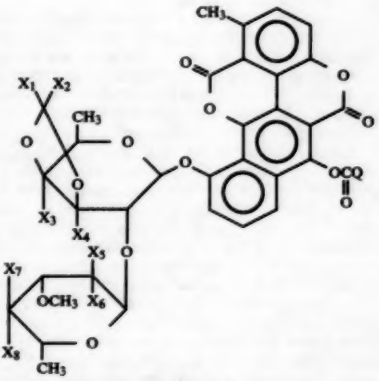
Filed Oct. 23, 1986, Ser. No. 922,433

Claims priority, application Japan, Oct. 23, 1985, 60-236833

Int. Cl.[5] C07H 17/04

U.S. Cl. 536—17.4 **28 Claims**

1. A chartreusin derivative of the formula, or a salt thereof:



wherein X_1 is a hydrogen atom or a C_{1-3} alkyl group which may be substituted by a substituent selected from the group consisting of a halogen atom, a C_{1-2} alkoxy group, and a C_{1-2} alkylthio group;

X_2 is a C_{1-3} alkyl group which may be substituted by a substituent selected from the group consisting of a halogen atom, a C_{1-2} alkoxy group and a C_{1-2} alkylthio group,

a C_{1-2} alkylcarbonyl-C_{1-2} alkyl group which may be substituted by a halogen atom,

a phenyl group,

a phenyl-C_{1-2} alkyl group,

a furyl group, or

a thienyl group

wherein each of the phenyl group, the phenyl-C_{1-2} alkyl group, the furyl group and the thienyl group may be substituted by a substituent selected from the group consisting of a halogen atom, a cyano group, a nitro group, a C_{1-3} alkyl group, a C_{1-3} alkoxy group, a C_{1-3} alkylthio group, a C_{1-3} alkycarbonyl group, a C_{1-2} alkoxycarbonyl group and a di-C_{1-3} alkylamino group

wherein each of the C_{1-3} alkyl group, the C_{1-3} alkoxy group, the C_{1-3} alkylthio group, the C_{1-3} alkylcarbonyl group, the C_{1-3} alkoxycarbonyl group and the di-C_{1-3} alkylamino group may be substituted by a halogen atom;

in the case where both X_1 and X_2 are said alkyl groups, the total number of carbon atoms of these alkyl groups is 4 or less;

X_1 is a hydrogen atom in the case where X_2 is said phenyl group, said phenyl-C_{1-2} alkyl group, said furyl group, or said thienyl group;

X_1 and X_2, when taken together with the adjacent carbon atom, may form a C_{3-7} cycloalkylidene which may be substituted by a substituent selected from the group consisting of a halogen atom, a C_{1-2} alkoxy group and a C_{1-2} alkylthio group;

each of X_3 and X_4 is a hydrogen atom or a methyl group, X_4 being a hydrogen atom in the case where X_3 is a methyl group;

X_5 is selected from the group consisting of a hydrogen atom, a hydroxyl group and an amino group;

X_6 is a hydrogen atom or a hydroxyl group, X_5 and X_6 may be bonded to the same oxygen atom at the same time, X_6 is a hydrogen atom in the case where X_5 is a hydroxyl group or an amino group; X_7 is a hydrogen atom or an amino group;

X_8 is a hydrogen atom or a hydroxyl group, X_8 being a hydrogen atom in the case where X_7 is an amino group; and Q is selected from the group consisting of a C_{1-11} alkyl group,

a C_{2-11} alkenyl group,

a C_{3-11} alkynyl group,

a C_{3-10} cycloalkyl group,

a C_{5-10} cycloalkenyl group,

a C_{1-10} alkylcarbonyl group, and

a C_{1-10} alkoxycarbonyl group

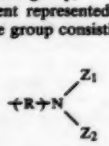
wherein each of the C_{1-11} alkyl group, the C_{2-11} alkenyl group, the C_{3-11} alkynyl group, the C_{3-10} cycloalkyl group, the C_{5-10} cycloalkenyl group, the C_{1-10} alkylcarbonyl group and the C_{1-10} alkoxycarbonyl group may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a cyano group, a nitro group, a C_{1-6} alkoxy group, a C_{1-6} alkylthio group, a C_{1-6} alkylsulfinyl group, a C_{1-6} alkylsulfonyl group, a C_{1-6} alkylcarbonyl group, a C_{1-6} alkoxycarbonyl group, a phenoxycarbonyl group, a C_{1-6} alkylcarbonyloxy group, a C_{3-7} cycloalkyl group, a phenyl group, a phenoxy group, a phenylthio group, a phenylsulfinyl group, a phenylsulfonyl group, a benzoyl group, a benzoyloxy group and a benzyloxy group

wherein each of the C_{1-6} alkoxy group, the C_{1-6} alkylthio group, the C_{1-6} alkylsulfinyl group, the C_{1-6} alkylsulfonyl group, the C_{1-6} alkylcarbonyl group, the C_{1-6} alkoxycarbonyl group, the phenoxycarbonyl group, the C_{1-6} alkylcarbonyloxy group, the C_{3-7} cycloalkyl group, the phenyl group, the phenoxy group, the phenylthio group, the phenylsulfinyl group, the phenylsulfonyl group, the benzoyl group, the benzyloxy group, and the benzoyloxy group may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-3} alkoxy group, and a C_{1-3} alkylthio group,

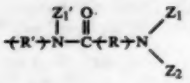
Q is a phenyl group which may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a cyano group, a nitro group, a C_{1-6} alkylsulfinyl group, a C_{1-6} alkylsulfonyl group, a C_{1-6} alkyl group, a C_{1-6} alkoxy group, a C_{1-6} alkylthio group, a C_{1-6} alkylcarbonyl group, a C_{1-6} alkoxycarbonyl group, and a C_{1-6} alkylcarbonyloxy group,

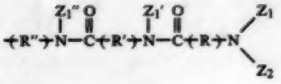
wherein each of the C_{1-6} alkyl group, the C_{1-6} alkoxy group, the C_{1-6} alkylthio group, the C_{1-6} alkylcarbonyl group, the C_{1-6} alkoxycarbonyl group, and the C_{1-6} alkylcarbonyloxy group may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-3} alkoxy group and a C_{1-3} alkylthio group,

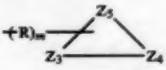
or Q is a substituent represented by any of the formulas selected from the group consisting of (a) to (i):

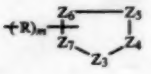

(a)

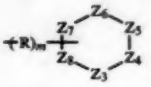
-continued

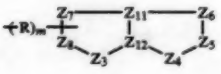

(b)

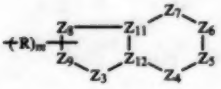

(c)

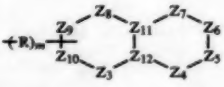

(d)


(e)


(f)


(g)


(h)


(i)

wherein each of the R, R′ and R″: is selected from the group consisting of

a C_{1-11} alkanediyl group,

a C_{2-11} alkenediyl group,

a C_{2-11} alkynediyl group,

a C_{3-10} cycloalkanediyl group, and

a C_{5-10} cycloalkenediyl group

wherein each of the C_{1-11} alkanediyl group, the C_{2-11} alkenediyl group, the C_{2-11} alkynediyl group, the C_{3-10} cycloalkanediyl group and the C_{5-10} cycloalkenediyl group may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-6} alkoxy group, a C_{1-6} alkylthio group, a C_{1-6} alkylsulfinyl group, a C_{1-6} alkylsulfonyl group, an aminocarbonyl group, a hydroxycarbonyl group, a C_{1-5} alkoxycarbonyl group, a phenyl group which may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-3} alkoxy group and a C_{1-3} alkylthio group, and a 3-indolyl group which may be substituted by a halogen atom,

or each of R, R′ and R″ is a phenylene group which may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-6} alkoxy group, a C_{1-6} alkylthio group, a C_{1-6} alkylsulfinyl group, a C_{1-6} alkylsulfonyl group, an aminocarbonyl group, a hydroxycarbonyl group, and a C_{1-5} alkoxycarbonyl group;

each of Z_1, Z'_1 and Z''_1 is a hydrogen atom, or a C_{1-6} alkyl group which may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-3} alkoxy group and a C_{1-3} alkylthio group;

Z_2 is selected from the group consisting of a hydrogen atom,
a formyl group,
a C_{1-6} alkyl group,
a C_{1-6} alkylcarbonyl group, and
a benzoyl group
wherein each of the C_{1-6} alkyl group, the C_{1-6} alkylcarbonyl group and the benzoyl group may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-3} alkoxy group and a C_{1-3} alkylthio group,
or Z_2 is a benzyloxycarbonyl group which may be substituted by a halogen atom;
Z_1 and Z_2 when taken together with the nitrogen atom, may form a nitrogen-containing C_{2-10} heterocyclic group which may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-3} alkyl group, a C_{1-3} alkoxy group, and a C_{1-3} alkylthio group;
m is zero or 1;
each of Z_3 through Z_{10} is selected from the group consisting of a $-CH_2-$ group, a

group, a

group, a

group, a =CH— group, a

group, a

group, a —NH— group, a

group, a

group, a

group, a =N— group, an oxygen atom and a sulfur atom; each of Z_{11} and Z_{12} is selected from the group consisting of a

group, a

group, a

group and a

group; any one of Z_3 through Z_{10} is a

group, a

group or a

group, each of the others being a substituent other than these three substituents, and any one of Z_3 through Z_{10} is selected from the group consisting of a —NH— group, a

group, a

group,

group, a =N— group, an oxygen atom and a sulfur atom, m being zero in the case where any one of Z_3 through Z_{10} is a

group, in the above formulas of groups for Z_3 through Z_{12}, Y_1 is selected from the group consisting of a halogen atom,

a hydroxyl group,
a mercapto group,
a nitro group,
a cyano group,
an amino group which may be substituted by a substituent selected from the group consisting of a C_{1-6} alkyl group (which may be substituted by a substituent selected from the group consisting of a halogen atom, or hydroxyl group, a mercapto group, a C_{1-3} alkoxy group and a C_{1-3} alkylthio group), a C_{1-3} alkylcarbonyl group (which may be substituted by a halogen atom), and a substituted carbonyl group having as the substituent any of the substituents represented by formulas (a) to (c),
a C_{1-3} alkyl group,
a C_{1-3} alkoxy group,
a C_{1-3} alkylthio group,
a C_{1-3} alkylcarbonyloxy group,
a C_{1-3} alkylcarbonylthio group,
a phenyl group,
wherein each of the C_{1-3} alkyl group, or the C_{1-3} alkoxy group, the C_{1-3} alkylthio group, the C_{1-3} alkylcarbonyloxy group, the C_{1-3} alkylcarbonylthio group and the phenyl group may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a cyano group, a C_{1-3} alkylcarbonyl group (which may be substituted by a halogen atom) and an amino group (which may be substituted by a substituted carbonyl group having as the substituent any of the substituents represented by formulas (a) to (c)),

and a nitrogen-containing C_{2-5} heterocyclic group may be substituted by a substituent selected from the group consisting of a halogen atom, a hydroxyl group, a mercapto group, a C_{1-3} alkyl group, a C_{1-3} alkoxy group, and a C_{1-3}-alkylthio group;

Y_2 is a C_{1-3} alkyl group which may be substituted by the same substituent as substituent for said C_{1-3}-alkyl group as Y_1;

Y_3 is a C_{1-3} alkyl group, a benzyloxy group,

wherein each of the C_{1-3} alkyl group and the benzyloxy group may be substituted by a halogen atom, or a substituent represented by any of formulas (a) to (c); and

Y_4 is a C_{1-3} alkyl group which may be substituted by a halogen atom; the total number of atoms of Q other than the hydrogen atoms being 30 or less, and Q being a substituent represented by any of the above formulas (d) to (i) with the proviso that this formula does not include the case where each of X_3, X_4, X_6 and X_7 is a hydrogen atom and each of X_5 and X_8 is a hydroxyl group.

4,927,920

SUGAR ESTER SYNTHESIS

Frederick W. Wagner, Walton; Rebecca S. de la Motte, and Maria A. Dean, both of Lincoln, all of Nebr., assignors to Nebraska Department of Economic Development, State of Nebraska, U.S.A., Lincoln, Nebr.

Filed Nov. 15, 1988, Ser. No. 271,661
Int. Cl.[5] C07H *13/02, 11/00, 1/00, 1/06*
U.S. Cl. 536—119 **11 Claims**

1. A process of making a sugar ester having a DS up to 2, comprising the steps of:

(a) reacting only a sugar and an ester of said sugar having a DS greater than about 2 in an organic solvent in the presence of a transesterification catalyst to form a sugar ester having a DS up to 2; and

(b) recovering said sugar ester having a DS up to 2 at a temperature below the boiling point of said organic solvent.

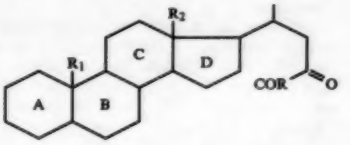
4,927,921

NOVEL 23-KETO-STEROIDS

Michel Vivat, Lagny-sur-Marne, and Jean Buendia, Le Perreux-sur-Marne, both of France, assignors to Roussel Uclaf, Paris, France

Filed Dec. 4, 1987, Ser. No. 128,997
Claims priority, application France, Dec. 5, 1986, 86 17051
Int. Cl.[5] C07J *9/00*
U.S. Cl. 540—110 **7 Claims**

1. A compound of the formula



I

wherein R_1 is hydrogen or methyl, R_2 is methyl or ethyl, the A, B, C and D rings saturated or containing at least one double bond and substituted with at least one member of the group consisting of 12-OH, protected 12-OH, 11 or 12=O, 11- or 12-protected keto, R is selected from the group consisting of halogen, —OH, alkylthio and alkoxy of 1 to 6 carbon atoms, aralkoxy, arylthio and aralkylthio of 7 to 15 carbon atoms and

R_3 and R_4 are individually hydrogen or alkyl of 1 to 6 carbon atoms or aralkyl of 7 to 15 carbon atoms or taken together with the nitrogen form a heterocycle, which may contain another nitrogen or oxygen atom excepting the product in which R is methoxy, R_1 and R_2 each represent methyl, A ring carries a 3β-acetoxy function and B ring contains a double bond in 5(6).

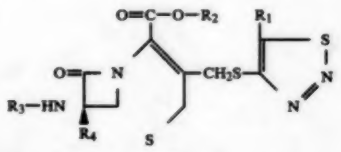
4,927,922

7β-(SUBSTITUTED)AMINO-3-SUBSTITUTED CEPHALOSPORANIC ACIDS AND ESTERS

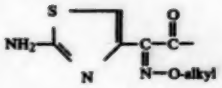
Ving J. Lee, Monsey, and William V. Curran, Pearl River, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

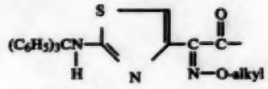
Continuation-in-part of Ser. No. 882,996, Jul. 8, 1986, abandoned. This application Jul. 21, 1988, Ser. No. 222,463
Int. Cl.[5] C07D *501/16;* **A61K** *31/545*
U.S. Cl. 540—227 **21 Claims**

1. A compound having the formula:



wherein R_1 is selected from the group consisting of hydrogen, alkyl(C_1–C_6), phenyl and substituted phenyl wherein the substituents are alkyl(C_1;14 C;hd 6); R_2 is selected from the group consisting of hydrogen, diphenylmethyl, α-acyloxyalkyl, t-butyl, benzyl, 4-nitrobenzyl and 4-methoxybenzyl and pharmaceutically acceptable salts selected from the group consisting of sodium and potassium; and R_3 is selected from the group consisting of





and 2-thienylacetyl; and R_4 is selected from the group consisting of hydrogen, —O—alkyl, —S—alkyl and formamido.

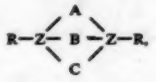
4,927,923

MACROPOLYCYCLIC RARE EARTH COMPLEXES AND APPLICATION AS FLUORESCENT TRACERS

Gérard Mathis, Bagnols S/Ceze, and Jean-Marie Lehn, Strasbourg, both of France, assignors to Compagnie Oris Industries, Gif-Sur-Yvette, France

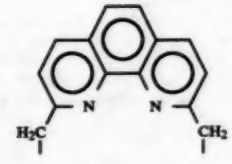
Filed Sep. 20, 1985, Ser. No. 778,215
Claims priority, application France, Sep. 26, 1984, 84 14799
Int. Cl.[5] G01N 00/00
U.S. Cl. 540—456 10 Claims

1. A macropolycyclic compound corresponding to the formula:

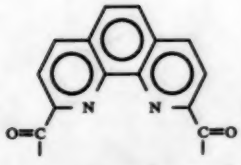


I

in which Z is a trivalent or tetravalent atom; R is nothing or represents hydrogen, the hydroxyl group, an amino group or a hydrocarbon radical; and the divalent radicals A, B and C independently of one another are selected from the group consisting of hydrocarbon chains, which hydrocarbon chains with one or more heteroatoms and interrupted by heteromacrocycle, wherein at least one of the radicals A, B and C includes or consists essentially of a radical selected from the group consisting of

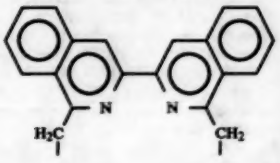


(1)

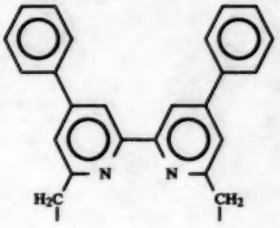


(2)

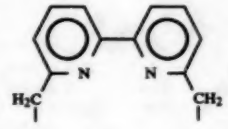
-continued



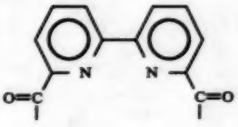
(3)



(4)



(5)



(6)

provided that when Z is N and A is radical 5 or 6, then B and C may not simultaneously be $-(CH_2)_2-O-(CH_2)_2-O-(CH_2)_2-$.

4,927,924

SYNTHESIS OF CAPROLACTAM

Weldon K. Bell, Pennington, and Werner O. Haag, Lawrenceville, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.

Filed Apr. 14, 1989, Ser. No. 338,015
Int. Cl.[5] C07D 201/04
U.S. Cl. 540—536 16 Claims

1. In a process for manufacturing epsilon-caprolactam by contacting cyclohexanone under conversion conditions with bonded particles of a crystalline zeolite catalyst, said zeolite having a silica to alumina ratio of at least 12, a Constraint Index of 1 to 12, and an Alpha Value higher than 50, the improvement comprising:

steaming said zeolite prior to said contacting step to reduce its Alpha Value to about 0.1 to 50, thereby increasing the selectivity and decreasing the aging rate of said catalyst.

4,927,925

PIPERIDINE COMPOUNDS AND THEIR USE AS THERMAL STABILIZERS

Giuseppe Cantatore, Bari, and Valerio Borzatta, Bologna, both of Italy, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

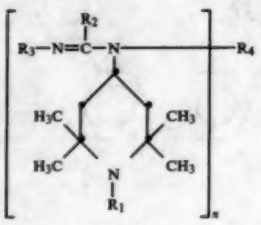
Division of Ser. No. 8,220, Jan. 29, 1987, Pat. No. 4,803,234. This application Oct. 13, 1988, Ser. No. 257,365

Claims priority, application Italy, Jan. 30, 1986, 19230A86

Int. Cl.[5] **C08J** *5/34;* **C09K** *15/16;* **C07D** *251/40*

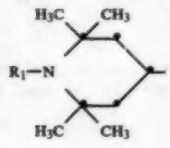
U.S. Cl. 540—598 **10 Claims**

1. A compound of formula I



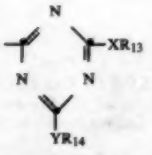
(I)

in which R_1 is hydrogen, O·, CN, NO, cyanomethyl, C_1–C_{12}-alkyl, C_3–C_{12}-alkenyl or C_3–C_{12}-alkynyl subject to the proviso that the carbon atom attached to the nitrogen atom is a primary carbon atom, C_7–C_{12}-aralkyl, C_1–C_{12}-alkanoyl, C_3–C_{12}-alkenoyl, C_3–C_{12}-alkynoyl, benzoyl or benzoyl substituted by one or more of C_1–C_4-alkyl or by —OH, 2,3-epoxypropyl, OH-monosubstituted C_2–C_6-alkyl or 2,3-dihydroxypropyl, R_2 is hydrogen, C_1–C_{18}-alkyl, C_5–C_{18}-cycloalkyl, C_6–C_{18}-aryl or C_7–C_{18}-aralkyl, R_3 is C_6–C_{18}-aryl or a group of the formula (II)



(II)

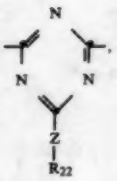
in which R_1 is as defined above, n is an integer of 1 or 2, and R_4 is a triazinyl radical of a valency equal to n, with the proviso that when n is 1, R_4 is



where R_{13} and R_{14} are hydrogen, C_1–C_{18}-alkyl, C_2–C_6-alkyl substituted by OH, by C_1–C_{18}-alkoxy or by C_2–C_{18}-dialkylamino; C_5–C_{18}-cycloalkyl, C_3–C_{18}-alkenyl, C_6–C_{18}-aryl, C_7–C_{18}-aralkyl or a group of formula II, and

X and Y are independently a direct bond, —O— or >N-R_{16} where R_{16} is hydrogen, C_1–C_{18}-alkyl, C_5–C_{18}-cycloalkyl, C_3–C_{18}-alkenyl, C_6–C_{18}-aryl, C_7–C_{18}-aralkyl or a group of formula II, or R_{16} is OH-monosubstituted C_2–C_6-alkyl, and at least one of groups $R_{13}X$ and $R_{14}Y$ are independently 4-morpholinyl or 1-hexahydroazepinyl; and

when n is 2, R_4 is



where —ZR_{22} is 4-morpholinyl or 1-hexahydroazepinyl.

4,927,926

DERIVATIVES OF 7-(1-AZETIDINYL)-1,4-DIHYDRO-4-OXO-3-QUINOLINECARBOXYLIC ACIDS, THEIR PREPARATION AND APPLICATION AS MEDICINES

Juan P. Corominas; Jordi F. Constansa, and Augusto C. Pinol, all of Barcelona, Spain, assignors to Laboratorios del Dr. Esteve S.A., Spain

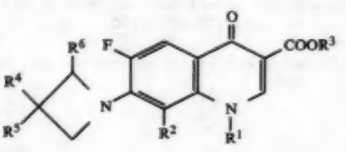
Filed Dec. 27, 1988, Ser. No. 290,315

Claims priority, application France, Dec. 29, 1987, 87 18289; Jul. 20, 1988, 88 09816

Int. Cl.[5] **C07D** *265/34, 215/20, 471/00, 519/02*

U.S. Cl. 544—101 **8 Claims**

1. New heterocyclic compounds characterised in that they correspond to formula I



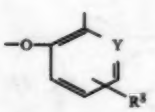
(I)

where

R^1 represents a lower alkenyl or alkyl radical, a haloalkyl radical, a cycloalkyl radical, an aminoalkyl radical, an aryl radical or a substituted aryl radical, particularly one having one or more fluorine atom substituents, R^2 represents a hydrogen atom, a halogen atom, or R^1 and R^2 may together form an X group;

R^3 represents a hydrogen atom or a lower alkyl radical; R^4 and R^5 and R^6 independently represent a hydrogen atom, a lower alkyl radical, a hydroxyl radical, an amino radical, an aminoalkyl radical, an alkylamino radical, a dialkylamino radical, an alkylaminoalkyl radical, an alkoxy radical, a mesyloxy radical, a hydroxyalkyl radical, a cyano radical, an acylaminoalkyl radical, a carboxylic radical, a carboxamido radical, a carboxyalkyl radical, a halogen atom, an alkylcarboxy radical for example acetoxy, an acetamido radical or an acetamidoalkyl radical, in these last two radicals the terminal free alkyl group may be fluorinated and the nitrogen atom in the acetamidoalkyl radical may carry an alkyl substituent;

X represents —CH_2—CH_2—CHR^7—, —O—CH_2—CHR^7— or



where

R^7 represents a hydrogen atom or a lower alkyl radical,

R^8 represents a hydrogen atom or a halogen atom, and Y

represents CH or N, with the exception however of compounds of formula (I) in which:

R^1 and R^2 together form a link represented by the group —O—CH_2—$CH(CH_3)$— and

R^3, R^4 and R^6 represent a hydrogen atom, and R^5 represents a hydroxyl radical (OH) or a hydroxymethyl radical (CH_2OH), and of the compound of formula (I) in which:

R^1 represents an ethyl radical

R^2 represents a fluorine atom

R^3, R^4 and R^6 represent hydrogen atoms, and

R^5 represents an ethylaminomethyl radical ($CH_3CH_2NHCH_2$).

8. The use of a compound according to claims 1 or 2 as an antibacterial agent.

4,927,927

FLUORESCENT DYES AND BIOLOGICAL AND ANALYTICAL USES THEREOF

Ramanuj Goswami, Rochester, and Chin H. Chen, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 824,765, Jan. 31, 1986, Pat. No. 4,812,395. This application Dec. 2, 1988, Ser. No. 278,993

Int. Cl.[5] **C07C** *97/18, 50/22, 50/38*

U.S. Cl. 544—106 **12 Claims**

1. A substituted or unsubstituted 4-oxo-4H-benz-[d,e]anthracene.

4,927,928

AROMATIC BENZAMIDO COMPOUNDS, THEIR PREPARATION AND THEIR USE IN HUMAN OR VETERINARY MEDICINE OR IN COSMETIC PREPARATIONS

Braham Shroot, Antibes; Jacques Eustache, Grasse, and Jean-Michel Bernardon, Nice, all of France, assignors to Centre International de Recherches Dermatologiques C.I.R.D., Valbonne, France

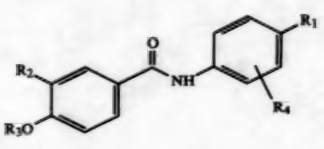
Filed Jan. 21, 1987, Ser. No. 5,727

Claims priority, application Luxembourg, Jan. 21, 1986, 86.258

Int. Cl.[5] **C07C** *101/72*

U.S. Cl. 544—154 **3 Claims**

1. An aromatic benzamido compound having the formula



(I)

wherein

R_1 represents —COR_5 wherein R_5 represents —OR_6 wherein R_6 represents hydrogen, lower alkyl or mono- or polyhydroxyalkyl,

R_2 represents 1-adamantyl,

R_3 represents alkyl having 1–10 carbon atoms,

R_4 represents hydrogen, lower alkyl or hydroxy, and the pharmaceutically or cosmetically acceptable salts of said aromatic benzamido compound of Formula I when R_6 represents hydrogen.

3. A compound selected from the group consisting of:

4-[3-(1-adamantyl)-4-methoxy benzamido]benzoic acid,

4-[3-(1-adamantyl)-4-methoxy benzamido]methyl benzoate,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]ethylamine,

4-[3-(1-adamantyl)-4-hydroxy benzamido]benzoic acid,

4-[3-(1-adamantyl)-4-hydroxy benzamido]methyl benzoate,

4-[3-(1-methylcyclohexyl)-4-methoxy benzamido]benzoic acid,

4-[3-(1-methylcyclohexyl)-4-methoxy benzamido]ethyl benzoate,

4-[3-(1-adamantyl)-4-decyloxy benzamido]benzoic acid,

4-[3-(1-adamantyl)-4decyloxy benzamido]methyl benzoate,

4-[3-(1-adamantyl)-4-hexyloxy benzamido]benzoic acid,

4-[3-(1-adamantyl)-4-hexyloxy benzamido]methyl benzoate,

4-[3-(1,1-dimethyl decyl)-4-methoxy benzamido]benzoic acid,

4-[3-(1,1-dimethyl decyl)-4-methoxy benzamido]methyl benzoate,

4-(3-tert. butyl-4-methoxy benzamido) benzoic acid,

4-(3-tert. butyl-4-methoxy benzamido) methyl benzoate,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]pyrrolidine,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]-piperidine,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]morpholine,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]tert. butylamine,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]ethylamine,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]aniline,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]benzylamine,

4-[3-(1-adamantyl)-4-methoxy benzamido]2-hydroxyethyl benzoate,

N-(4-acetylphenyl)-3-(1-adamantyl)-4-methoxy benzamide,

N-[4-(1-hydroxyethyl) phenyl]-3-(1-adamantyl)-4-methoxy benzamide,

N-[4-[3-(1-adamantyl)-4-methoxy benzamido]benzoyl]2-hydroxyethylamine and

2-hydroxy-4-[3-(1-adamantyl)-4-methoxy benzamido]methyl benzoate.

4,927,929

MELAMINE SALTS OF ALKYL ACID PHOSPHATES

Richard F. Grossman, Shelton, and Francis W. McKane, Jr., Bridgeport, both of Conn., assignors to Synthetic Products Company, Cleveland, Ohio

Filed Aug. 1, 1988, Ser. No. 226,866

Int. Cl.[5] **C07D** *251/70;* **C07F** *9/6521*

U.S. Cl. 544—195 **2 Claims**

1. A melamine salt of an alkyl acid phosphate where the alkyl group is about C_1 to about C_{20}.

4,927,930

POLYAMINES PARTIALLY SUBSTITUTED BY PIPERIDINE-TRIAZINES

Giuseppe Cantatore, Bitonto; Valerio Borzatta, Bologna, and Franca Masina, Anzola Emilia, all of Italy, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

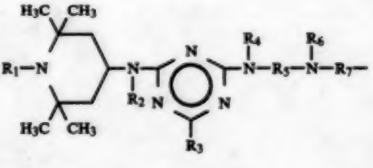
Filed May 24, 1989, Ser. No. 356,814

Claims priority, application Italy, May 31, 1988, 20809 A/88

Int. Cl.[5] **C07D** *251/40;* **C08J** *5/34;* **C09K** *15/16*

U.S. Cl. 544—198 **10 Claims**

1. A compound of the formula (I)



(I)

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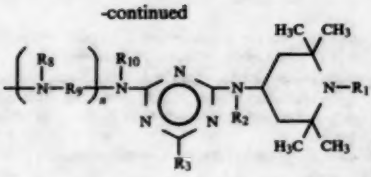
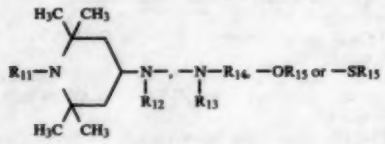
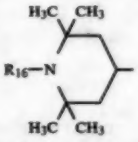


which R_1 is hydrogen, C_1–C_4alkyl, O• , OH, NO, CH_2CN, C_1–C_{18}alkoxy, C_5–C_{12}cycloalkoxy, C_3–C_6alkenyl, C_7–C_9phenylalkyl which is unsubstituted or mono- di- or tri-substituted on the phenyl by C_1–C_4alkyl, C_1–C_8acyl or C_2–C_4alkyl substituted by one OH in the 2-, 3- or 4-position, R_2 is hydrogen, C_1–C_{18}alkyl, C_5–C_{12}cycloalkyl which is unsubstituted or mono-, di- or tri-substituted by C_1–C_4alkyl, C_7–C_9phenylalkyl which is unsubstituted or mono-, di or tri-substituted on the phenyl by C_1–C_4alkyl, or C_2–C_4alkyl substituted by OH, C_1–C_8alkoxy or di-(C_1–C_4alkyl)-amino in the 2-, 3- or 4-position, R_3 is C_1–C_{18}alkyl, phenyl which is unsubstituted or mono-, di- or tri-substituted by C_1–C_4alkyl, or one of the groups

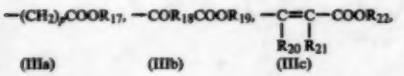


in which R_{11} is as defined above for R_1, R_{12} is as defined above for R_2, R_{13} and R_{14} which can be identical or different are as defined above for R_2 or are C_3–C_6alkenyl or, together with the nitrogen atom to which they are linked, form part of a 5-membered to 7-membered heterocyclic ring and R_{15} is C_1–C_{18}alkyl, C_5–C_{12}cycloalkyl which is unsubstituted or mono-, di- or tri-substituted by C_1–C_4alkyl, C_3–C_6alkenyl, phenyl which is unsubstituted or mono-, di- or tri-substituted by C_1–C_4alkyl, C_7–C_9phenylalkyl which is unsubstituted or mono-, di- or tri-substituted on the phenyl by C_1–C_4alkyl, of a group of the formula (II)



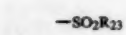
(II)

with R_{16} being as defined above for R_1, R_4 and R_{10} which can be identical or different are hydrogen, C_1–C_{18}alkyl, C_5–C_{12}cycloalkyl which is unsubstituted or mono-, di- or tri-substituted by C_1–C_4alkyl or a group of the formula (II), R_5, R_7 and R_9 which can be identical or different are C_2–C_{12}alkylene, n is zero or 1, R_6 and R_8 are C_1–C_{18}alkyl, C_5–C_{12}cycloalkyl which is unsubstituted or mono-, di- or tri-substituted by C_1–C_4alkyl, C_3–C_6alkenyl, C_7–C_9phenylalkyl which is unsubstituted or mono-, di- or tri-substituted on the phenyl by C_1–C_4alkyl, C_2–C_4alkyl substituted by OH in the 2-, 3-or 4-position, or a group of the formula (II) or R_6 and R_8 are one of the groups of the formula (IIIa)–(IIId)



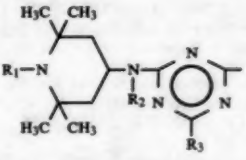
(IIIa) (IIIb) (IIIc)

-continued



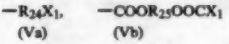
(IIId)

in which p is zero or an integer from 1 to 5, R_{17}, R_{19} and R_{22} which can be identical or different are C_1–C_{18}alkyl, C_5–C_{12}cycloalkyl which is unsubstituted or mono-, di- or tri-substituted by C_1–C_4alkyl, C_3–C_{18}alkenyl or a group of the formula (II), R_{18} is a direct bond or C_1–C_{12}alkylene, cyclohexylene or phenylene, R_{20} is hydrogen, C_1–C_4alkyl or phenyl, R_{21} is —CN or a group —$COOR_{22}$ with R_{22} being as defined above, and R_{23} is C_1–C_{18}alkyl or phenyl which is unsubstituted or mono-, di- or tri-substituted by C_1–C_4alkyl, or R_8 is a group of the formula (IV)



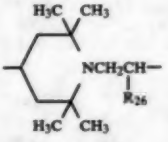
(IV)

with R_1, R_2 and R_3 being as defined above, and, if n is zero or if R_8 is a group of the formula (IV), R_6 can also be one of the groups of the formulae (Va) or (Vb)

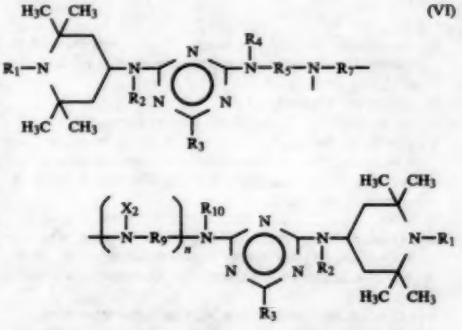


(Va) (Vb)

where R_{24} is C_2–C_{12}alkylene, 2-hydroxytrimethylene or xylylene and R_{25} is C_2–C_{12}alkylene, C_4–C_{12}alkylene interrupted by 1, 2 or 3 oxygen atoms, cyclohexylenedimethylene, methylenedicyclohexylene, isopropylidenedicyclohexylene, phenylene, xylylene or a group



with R_{26} being hydrogen, C_1–C_4alkyl or phenyl, and X_1 is a group of the formula (VI)



(VI)

where R_1, R_2, R_3, R_4, R_5, R_7, R_9, R_{10} and n are as defined above, and X_2 is a group of the formula (IV).

4,927,931
PREPARATION OF ALKYL-EXTENDED, ALCOHOL-EXTENDED OR AMINE-EXTENDED PIPERAZINES

David C. Molzahn; George E. Hartwell, and Robert G. Bowman, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 1, 1988, Ser. No. 265,610
Int. Cl.[5] D01J 23/20; C07D 241/02
U.S. Cl. 544—357 29 Claims

1. A process for preparing alkyl-extended, alcohol-extended or amine-extended piperazines or mixtures thereof comprising contacting an aliphatic alcohol with a reactant amine, wherein at least one of the aliphatic alcohol or reactant amine contains a piperazine moiety, the contacting occurring in the presence of a catalyst under conditions such that an alkyl-extended, alcohol-extended or amine-extended piperazine or mixture thereof is formed, said catalyst being a composition containing a Group VB metal.

4,927,932
REACTION PRODUCTS OF PYRIMIDINE, PYRIDAZINE AND 4-ISOPROPENYL-1-CYCLOHEXENE-1-CARBOXALDEHYDE

Duane S. Treybig, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 168,297, May 15, 1988, Pat. No. 4,831,137, which is a division of Ser. No. 840,190, Mar. 17, 1986, Pat. No. 4,755,600, which is a division of Ser. No. 726,555, Apr. 23, 1985, Pat. No. 4,629,770. This application Jan. 23, 1989, Ser. No. 300,462
Int. Cl.[5] C07D 403/06, 241/12
U.S. Cl. 544—357 1 Claim

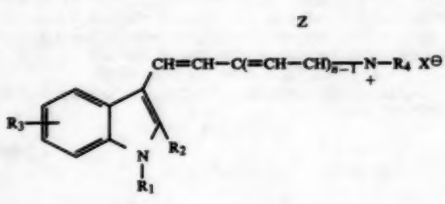
1. A composition which results from reacting (A) nitrogen containing aromatic heterocyclic compound having at least one hydrogen atom attached to a carbon atom which is attached to the ring selected from the group consisting of pyridazines, pyrimidines or a combination of the two compounds with (B) 4-isopropenyl-1-cyclohexene-1-carboxaldehyde.

4,927,933
DIRECT POSITIVE DIMETHINE CYANINE DYES CONTAINING 1-ARYL-2-HETEROARYL INDOLE NUCLEUS

Thomas D. Weaver, Rochester, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 66,552, Jun. 26, 1987, Pat. No. 4,839,271. This application Jan. 31, 1989, Ser. No. 304,574
Int. Cl.[5] C07D 471/04
U.S. Cl. 546—113 3 Claims

1. A cyanine dye of the following formula:



wherein

R_1 is an aryl group of 6 to 10 carbon atoms;

R_2 is a heterocyclic azaaryl group selected from the group consisting of pyridyl, methyl substituted pyridyl and quinolyl;

R_3 is a member selected from the group consisting of a hydrogen atom, an alkyl group of 1 to 4 carbon atoms, an alkoxy group of 1 to 4 carbon atoms, an aryloxy group of 6 to 10 carbon atoms, a halogen atom and nitro;

R_4 is a member selected from the group consisting of an alkyl group of 1 to 4 carbon atoms, an alkyl group of 1 to 4 carbon atoms substituted with a member selected from the group consisting of halogen, nitrile, sulfonate, sulfate, hydroxyl, alkoxy and carboxy; an alkenyl group of 1 to 4 carbon atoms and an aryl group of 6 to 10 carbon atoms;

n is a positive integer of from 1 to 2;

x is an acid anion; and

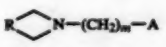
z is the non-metallic atoms necessary to complete a desensitizing nucleus containing from 5 to 6 atoms in a heterocyclic ring.

4,927,934
POLYCYCLICAMINE WITH PSYCHOTROPIC ACTIVITY

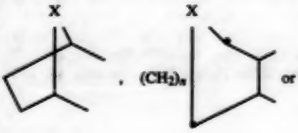
Magid A. Abou-Gharbia, Wilmington, Del., and Usha R. Patel, Audubon, Pa., assignors to American Home Products Corporation, New York, N.Y.

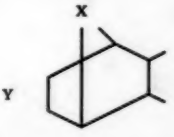
Division of Ser. No. 119,530, Nov. 12, 1987, Pat. No. 4,855,430. This application May 5, 1989, Ser. No. 348,332
Int. Cl.[5] C07D 215/06, 401/06, 487/08
U.S. Cl. 546—152 4 Claims

1. A compound having the formula



wherein R represents





where

X is lower alkylene, vinylene or O;

Y is lower alkylene or vinylene;

the dotted line represents an optional double bond;

m is 1–3;

n is 2–4;

A is quinolinyl or quinolinyl substituted with lower alkyl, lower alkoxy, halo, cyano, nitro or trifluoromethyl;

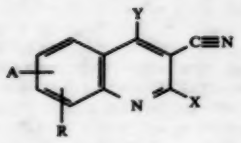
and the pharmacologically acceptable salts thereof.

4,927,935
3-CYANOQUINOLINE DERIVATIVES

Alfred Hackenberger, Paulo, and Manfred Patsch, Wachenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwighafen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 60,165, Jun. 10, 1987, abandoned. This application Nov. 7, 1988, Ser. No. 268,264
Claims priority, application Fed. Rep. of Germany, Jun. 21, 1986, 3620856
Int. Cl.[5] C07D 215/54
U.S. Cl. 546—157 3 Claims

1. A compound of the formula I



(I)

where

A is nitro, amino, halocarbonyl or halosulfonyl,

R is hydrogen, halogen, nitro, cyano, C_1–C_4-alkanoylamino, hydroxyl, C_1–C_4-alkoxy, phenoxy which is unsubstituted or substituted by methyl or chloro, mercapto, C_1–C_4-alkylthio, phenylthio which is unsubstituted or substituted by ethyl, fluoro, or methoxy, carboxyl, C_1–C_4-alkoxycarbonyl, phenoxycarbonyl which is unsubstituted or substituted by isopropyl, bromo, or methoxy, carbamoyl, hydroxysulfonyl, C_1–C_4-alkylsulfonyl, phenylsulfonyl which is unsubstituted or substituted by ethyl, chloro, or isopropoxy, sulfamoyl or trifluoromethyl or is C_1–C_4-alkyl which is unsubstituted or substituted by hydroxyl, C_1–C_4-alkoxy or halogen, and

X and Y are each, independently of one another, halogen, hydroxysulfonyl, C_1–C_4-alkoxy or phenoxy which is unsubstituted or substituted by methyl or chloro, or phenoxy, subject to the proviso that at least one of X and Y is halogen.

4,927,936

QUINOLINE DERIVATIVES

Roger Crossley, Reading, and Kenneth Heatherington, Burnham, both of United Kingdom, assignors to John Wyeth and Brother Ltd., Maidenhead, England

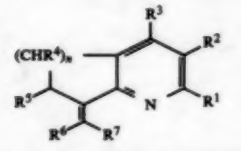
Continuation-in-part of Ser. No. 571,972, Jan. 18, 1984, Pat. No. 4,837,329. This application Dec. 16, 1988, Ser. No. 285,907

Claims priority, application United Kingdom, Jan. 19, 1983, 8301377

Int. Cl.[5] C07D *215/04*

U.S. Cl. 546—181 **5 Claims**

1. A compound of formula II



II

or a pharmaceutically acceptable salt thereof, wherein

R^1, R^2, R^3, R^4, R^5, R^6 and R^7 are, independently, hydrogen, or alkyl of 1 to 6 carbon atoms, cycloalkyl of 4 to 6 carbon atoms or aralkyl of 7 to 12 carbon atoms, any of which radicals may be monosubstituted by alkyl or 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, or $—CF_3$ or phenyl radicals which may be monosubstituted by alkyl of 1 to 6 carbon atoms or $—CF_3$;

or R^2 and R^3, taken together, form a 5, 6 or 7 membered saturated carbocyclic ring;

R^4 and R^5 may also be alkoxy of 1 to 6 carbon atoms or cycloalkoxy of 4 to 6 carbon atoms;

n is one of the integers 1, 2 or 3;

and, if more than one R^4 group is present, the R^4 groups may be the same or different;

with the provisos that (1) when R^1, R^2, R^3, R^4, and R^5 are all hydrogen, R^6 and R^7 are not both hydrogen, (2) when R^1 and R^3 are both phenyl and when R^1 is methyl and R^4 is methyl, R^6 and R^7 are not both methyl, and (3) when R^1 is hydrogen or methyl, R^3 is hydrogen or methyl and R^2, R^4, R^5, and R^6 are all hydrogen, then R^7 is other than unsubstituted phenyl.

4,927,937

PHARMACOLOGICALLY ACTIVE ε-VALEROLACTAMS

Ming-he Yang; Yan-rong Chen; Geng-tao Liu, and Liang Huang, all of Beijing, China, assignors to Chinese Academy of Medical Science, Beijing, China and Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

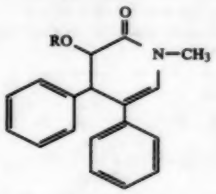
Continuation-in-part of Ser. No. 181,846, Apr. 15, 1988, abandoned, which is a continuation of Ser. No. 4,984, Jan. 20, 1987, abandoned. This application Apr. 19, 1989, Ser. No. 340,614

Claims priority, application United Kingdom, Jan. 20, 1986, 8601257

Int. Cl.[5] C07D *211/76*

U.S. Cl. 546—296 **4 Claims**

1. A substantially pure compound of the formula



wherein

R represents hydrogen or an acyl group having 1 to 18 carbon atoms.

4. A method for the isolation of the substantially pure compound according to claim 3 from the leaves of *Clausenia lausium* which comprises the steps of:

(a) heating leaves of *Clausenia lausium* with the boiling water,

(b) adding dilute acid to the concentrated aqueous extract,

(c) passing the supernatant through a column of cation ion exchange resin,

(d) treating the resin with a base,

(e) extracting the resin with an organic solvent,

(f) chromatographing the concentrated extract on silica or aluminum oxide column with chloroform, methylene chloride, ether or chloroform/methanol mixture as the eluting agent and

(g) collecting and concentrating the eluate with an R_f-value of 0.53 on TLC (silica gel plate, $CHCl_3$:meOH=97:3 as electing agent).

4,927,938

HALOGEN SUBSTITUTED PYRIDYLALKYL KETONES

Hans Lindel, Leverkusen, and Werner Hallenbach, Langenfeld, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

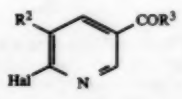
Filed Jul. 6, 1988, Ser. No. 215,683

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 3723070

Int. Cl.[5] C07D *213/50*

U.S. Cl. 546—315 **1 Claim**

1. A compound of the formula



(II)

in which

Hal and R^2 each independently is halogen and R^3 is alkyl.

4,927,939

CARDIOTONIC AROYLTHIAZOLONES

J. Martin Grisar, Wissembourg, France; Richard C. Dage, and Richard A. Schnettler, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

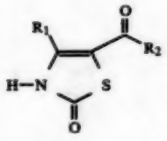
Continuation of Ser. No. 787,226, Oct. 15, 1985, abandoned. This application Mar. 17, 1987, Ser. No. 27,066

The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.

Int. Cl.[5] C07D *277/34*

U.S. Cl. 548—188 9 Claims

1. A compound of the formula



wherein

R_1 is a hydrogen or (C_1–C_4) alkyl group, and

R_2 is an unsubstituted benzyl or a phenyl or benzyl substituted with one or two members of the group consisting of (C_1–C_4) alkyl, (C_1–C_4) alkoxy, carboxy, carb(C_{11}–C_4)alkoxy, imidazolyl, (C_1–C_4) alkylthio, (C_1–C_4) alkylsulfinyl, (C_1–C_4) alkylsulfonyl, trifluoromethyl, cyano, amino, mono- and di- (C_1C_4) alkylamino, pyrrolidino, piperidino, morpholino, piperazino N-(C_1–C_4) alkyl-piperazino or halogen group or a methylenedioxy group.

4,927,940

PROCESS FOR LOW CHLORIDE 1,2,4-TRIAZOL-5-ONE

MAX M. Boudakian, Pittsford, and Delmer A. Fidler, Rochester, both of N.Y., assignors to Olin Corporation, Cheshire, Conn.

Filed May 1, 1989, Ser. No. 345,376

Int. Cl.[5] C07D *249/12*

U.S. Cl. 548—263.2 15 Claims

1. A process for producing 1,2,4-triazol-5-one which comprises reacting an aqueous hydrazine solution with urea to form a reaction mixture of semicarbazide and ammonia, concentrating the reaction mixture, adding an aqueous solution of a mineral acid to form a slurry of a salt of semicarbazide, admixing a formic acid compound with the slurry, and heating the slurry to produce 1,2,4-triazol-5-one.

4,927,941

FLUORINE-CONTAINING NITROAZOLE DERIVATIVES AND RADIOSENSITIZER COMPRISING THE SAME

Tsutomu Kagiya; Mitsuyuki Abe, both of Kyoto; Seiichi Nishimoto, Nara; Yuta Shibamoto, Kyoto; Kazuhiro Shimokawa, Settsu; Yorisato Hisanaga, Ibaraki; Tatsuo Nakada, and Toru Yoshizawa, both of Osaka, all of Japan, assignors to Yasunori Nishijima & Daikin Industries Ltd., Kyoto, Japan

Filed Jun. 9, 1988, Ser. No. 204,367

Claims priority, application Japan, Jun. 10, 1987, 62-147459; Jun. 24, 1987, 62-156787; Sep. 26, 1987, 62-241574; Dec. 10, 1987, 62-314686; Jan. 29, 1988, 63-20456; Mar. 31, 1988, 63-79230

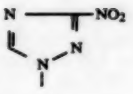
Int. Cl.[5] C07D *249/10*

U.S. Cl. 548—264.8 1 Claim

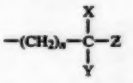
1. A nitroazole derivative of the formula:

NA-R_f (I)

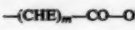
wherein NA represents 3-nitro-1,2,4-triazol-1-yl of the formula:

 (II)

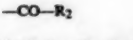
and R_f is a fluorine-containing organic group

 (IV)

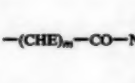
wherein X is a hydrogen atom or a fluorine atom; Y is a fluorine atom, a chlorine atom, a trifluoromethyl group, a methyl group or a hydroxy group, or X and Y together represent =O; Z is a hydrogen atom, a fluorine atom, a C_1–C_5 alkyl or a C_1–C_5 fluoroalkyl group which may be substituted with hydroxy, a group of the formula:

 (V)

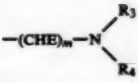
wherein R_1 is a hydrogen atom or a C_1–C_5 alkyl or a C_1–C_5 fluoroalkyl group, E is a hydrogen atom or a fluorine atom and m is 0 or 1,

 (VI)

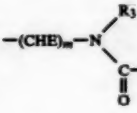
wherein R_2 is a C_1–C_5 alkyl or a C_1–C_5 fluoroalkyl group,

 (VII)

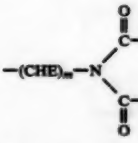
wherein R_3 and R_4 are the same or different and a hydrogen atom, a hydroxy group or a C_1–C_5 alkyl or a C_1–C_5 fluoroalkyl group which may be substituted with a hydroxy group, a C_1–C_5 alkoxy group or an amide group, or R_3 and R_4 forms a 3 to 6 membered ring together with the nitrogen atom to which they bond, and E and m are the same as defined above,

 (VIII)-(1)

wherein R_3, R_4, E and m are the same as defined above,

 (VIII)-(2)

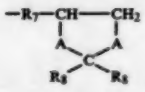
wherein R_3, R_4, E and m are the same as defined above,

 (VIII)-(3)

wherein R_3, R_4, E and m are the same as defined above,

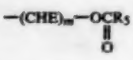
$$-(CHE)_m-A-R_5 \quad (IX)$$

wherein A is an oxygen atom or a sulfur atom, R_5 is a hydrogen atom, a C_1–C_5 alkyl or a C_1–C_5 fluoroalkyl group which may be substituted with a hydroxy group, a C_1–C_5 alkoxy group or a C_1–C_5 oxyacyl group, a group of the formula: —CO—R_6 in which R_6 is a C_1–C_5 alkyl group,



(X)

wherein R_7 is a C_1–C_7 alkylene group, R_8 is a C_1–C_3 alkyl group and A is the same as defined above, or



(XI)

wherein R_5 is a C_1–C_5 alkyl or a C_1–C_5 fluoroalkyl group and E and m are the same as defined above, Y and Z may together form $=CF-CF_3$ or $=CHOR_6$ in which R_6 is the same as defined above, and n is 0 or 1.

4,927,942

METHOD FOR THE PREPARATION OF IMIDAZOLES

George P. Speranza, and Wei-Yang Su, both of Austin, Tex., assignors to Texaco Chemical Co., White Plains, N.Y.

Filed Dec. 15, 1988, Ser. No. 284,884
Int. Cl.[5] C07D *233/58*
U.S. Cl. 548—335 13 Claims

1. In a method for preparation of imidazoles by dehydrogenation of imidazolines over a nickel catalyst, the improvement comprising reacting the imidazoline over a catalyst selected from the group consisting of nickel-copper, nickel-chromium and nickel-copper-chromium at a temperature of 160° C. to 300° C. and a pressure of atmospheric to 500 psig.

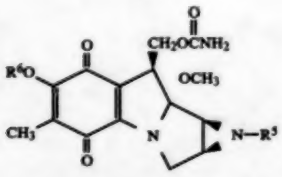
4,927,943

SUBSTITUTED 7-OXOMITOSANES

Dolatrai M. Vyas; Terrence W. Doyle, both of Fayetteville, and Richard A. Partyka, Liverpool, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 160,474, Feb. 25, 1988, Pat. No. 4,814,445, which is a continuation of Ser. No. 744,570, Jun. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 646,888, Sep. 4, 1984, abandoned. This application Nov. 7, 1988, Ser. No. 267,601
Int. Cl.[5] C07D *487/14*; A61K *31/40*
U.S. Cl. 548—422 1 Claim

1. A compound having formula IX



IX

wherein R^6 is 2-benzylthio)ethyl and R^5 is hydrogen.

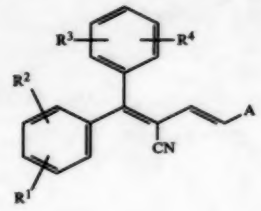
4,927,944

ANTIHYPERCHOLESTEROLEMIC NITRILE COMPOUNDS

Sing-Yuen Sit, Meriden, and John J. Wright, Guilford, both of Conn., assignors to Bristol-Myers Company, New York, N.Y.

Filed Aug. 25, 1988, Ser. No. 236,563
Int. Cl.[5] C07D *309/30*
U.S. Cl. 549—292 4 Claims

1. A compound of the formula

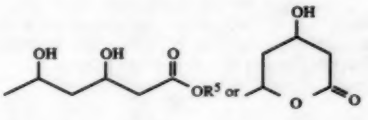


I

wherein

R^1, R^2, R^3 and R^4 each are independently hydrogen, halogen, C_{1-4} alkyl, C_{1-4} alkoxy or trifluoromethyl;

A is



and

R^5 is hydrogen, a hydrolyzable ester group or a cation to form a non-toxic pharmaceutically acceptable salt.

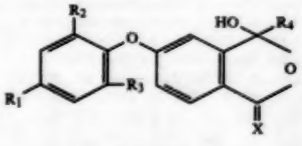
4,927,945

PROCESS FOR PREPARING DIPHENYL ETHERS

Stuart P. Briggs, Faversham, and Derek A. Wood, Sittingbourne, both of England, assignors to Shell Internationale Research Maatschappij, B.V., The Hague, Netherlands

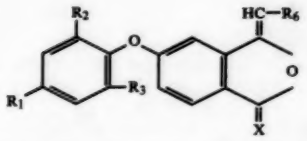
Filed Aug. 9, 1988, Ser. No. 230,104
Claims priority, application United Kingdom, Sep. 1, 1987, 8720511
Int. Cl.[5] C07D *307/00*
U.S. Cl. 549—305 14 Claims

1. A process for the preparation of a diphenyl ether derivative of formula II



(II)

wherein R_1 represents a hydrogen or halogen atom or an alkyl or haloalkyl group, R_2 and R_3, which may be the same or different, each independently represents a hydrogen or halogen atom, or an alkyl, haloalkyl, nitro or cyano group, R_4 represents and alkyl group and X represents an oxygen or sulphur atom, comprising hydrolysing a compound of formula III



(III)

where R_1, R_2, R_3 and X are as defined above and R_6 is a hydrogen atom or an alkyl group, with an alkali metal hydroxide under hydrolysing conditions, said hydrolysis step being undertaken in aqueous solution at a temperature ranging from ambient to the refluxing temperature of said solution.

4,927,946

PROCESS FOR THE PREPARATION OF 5-BROMO-5-NITRO-1,3-DIOXANE

Willi Wuest, Ratingen; Rainer Eskuchen, Duesseldorf; Herbert Esser, Troisdorf, and Hasso Leischner, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,918

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1988, 3814774

Int. Cl.[5] C07D 319/06

U.S. Cl. 549—371 **16 Claims**

1. A process for the preparation of 5-bromo-5-nitro-1,3-dioxane comprising the steps of

A. brominating an alkali metal salt and/or a water-soluble alkaline-earth metal salt of 2-nitro-1,3-propanediol by adding said salt to a mixture of bromine and aqueous hydrobromic acid while controlling the temperature of the reaction mixture so that it does not exceed about 30° C. by both cooling the reaction mixture and controlling the rate of addition of said salt to form a reaction mixture containing 2-bromo-2-nitro-1,3-propanediol;

B. adding to the reaction mixture containing 2-bromo-2 nitro-1,3-propanediol from step A. paraformaldehyde and sulfuric acid and carrying out the reaction at a temperature in the range of from about 70° C. to about 110° C. to form a reaction mixture containing 5-bromo-5-nitro-1,3-dioxane;

C. allowing the reaction mixture from step B. to separate into an aqueous phase and an organic phase which contains 5-bromo-nitro-1,3-dioxane; and

D. separating the organic phase from the aqueous phase.

4,927,947

ETHYNYLHETEROAROMATIC-ACIDS HAVING RETINOIC ACID-LIKE ACTIVITY

Roshantha A. S. Chandraratna, El Toro, Calif., assignor to Allergan, Inc., Irvine, Calif.

Division of Ser. No. 180,649, Apr. 1, 1988, abandoned, which is a continuation of Ser. No. 946,729, Dec. 24, 1986, abandoned. This application Jan. 30, 1989, Ser. No. 303,864

Int. Cl.[5] C07D 307/02, 237/02, 241/02

U.S. Cl. 549—484 **3 Claims**

1. A compound of the formula

I

where

A is furyl;

n is 0–5; and

B is H, —COOH or its esters, amides and pharmaceutically acceptable salts, —CHO and its acetal derivatives, —CH_2OH and its ether and acyl ester derivatives, or —COR_1 and its ketal derivatives where R_1 is —$(CH_2)_nCH_3$ where n is defined above; or a pharmaceutically acceptable salt.

4,927,948

PROCESS FOR STABILIZING ORGANOSILANES CONTAINING METHACRYLOXY OR ACRYLOXY GROUPS

Günther Bernhardt, Sankt Augustin; Jürgen Amort; Heinz Kragl, both of Troisdorf, and Margret Haas, Cologne, all of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

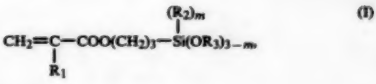
Filed Sep. 19, 1989, Ser. No. 409,604

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1988, 3832621

Int. Cl.[5] C07F 7/08, 7/18

U.S. Cl. 556—401 **3 Claims**

1. The method of stabilizing organosilanes containing methacryloxy groups or acryloxy groups of the formula



(I)

wherein R1 is hydrogen or methyl,

R_2 and R_3, which may be identical to or different from each other, are each individually alkyl of 1 to 4 carbon atoms, and

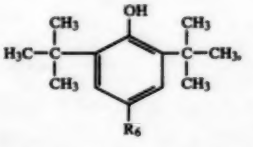
m is 0, 1 or 2, which comprises using as a stabilizer a mixture comprising

(a) at least one N,N'-di-substituted-p-phenylenediamine of the formula

(II)

wherein T_4 and R_5, which may be identical to or different from each other, are each individually phenyl, naphthyl, straight or branched alkyl of 3 to 8 carbon atoms or cyclohexyl, and

(b) at least one substituted phenol of the formula



(III)

wherein R_6 is alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms.

4,927,949

METHOD OF PREPARING AN AMINOALKYLALKOXYSILANE

Keiji Kabeta, and Michio Zenbayashi, both of Gunma, Japan, assignors to Toshiba Shilicone Co., Ltd., Tokyo, Japan

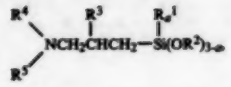
Filed Sep. 13, 1989, Ser. No. 406,728

Claims priority, application Japan, Sep. 30, 1988, 63-246097

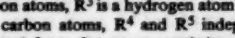
Int. Cl.[5] C07F 7/10

U.S. Cl. 556—413 **4 Claims**

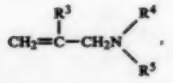
1. A method of preparing an aminoalkylalkoxysilane of the formula:



in which R^1 and R^2 independently are alkyl groups having 1–8 carbon atoms, R^3 is a hydrogen atom or an alkyl group having 1–6 carbon atoms, R^4 and R^5 independently are a member selected from the group consisting of a hydrogen atom, an alkyl group having 1–10 carbon atoms, $-CH_2CH_2NH_2$, $-CH_2CH_2NHCH_2CH_2NH_2$, an allyl group, a substituted phenyl group and a nonsubstituted phenyl group and a is an integer from 0–2, comprising the step of reacting an alkoxysilane of the formula:



where R^1, R^2 and a are described above, with an allylamine of the formula:



where R^3, R^4 and R^5 are as described above, in the presence of a catalyst composition selected from the group consisting of (1) a rhodium complex catalyst and a heterocyclic compound containing nitrogen and/or sulfur atoms and (2) a rhodium complex catalyst having a heterocyclic compound containing nitrogen and/or sulfur atoms as a ligand.

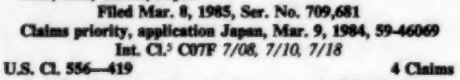
4,927,950

FLUORINE-CONTAINING SILANE COMPOUNDS

Iwao Hisamoto, Suita; Masaru Hirai, Settsu, and Sueyoshi Ishikawa, Kishiwada, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Mar. 8, 1985, Ser. No. 709,681
Claims priority, application Japan, Mar. 9, 1984, 59-46069
Int. Cl.[5] C07F 7/08, 7/10, 7/18
U.S. Cl. 556—419 **4 Claims**

1. A fluorine-containing silane compound of the formula:



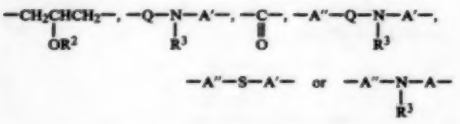
(I)

wherein

R_f is a fluorine-containing C_4–C_{18} aliphatic group,

R^1 is hydrogen or a C_1–C_4 alkyl group,

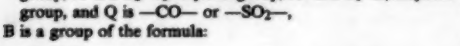
A is a straight or branched C_1–C_{12} alkylene group or a group of the formula:



in which

R^2 is hydrogen or a C_1–C_3 acyl group, R^3 is a C_1–C_6 acyl group, A′ is a C_2–C_8 alkylene group, A″ is a C_1–C_4 alkylene group, and Q is —CO— or —SO_2—,

B is a group of the formula:



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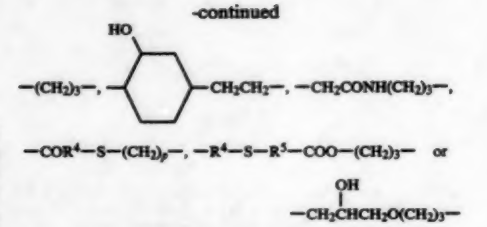


in which

R^4 and R^5 are each a straight or branched C_2 or C_3 alkylene group, and p is 2 or 3,

X is chlorine or a C_1–C_3 alkoxy group,

X′ is chlorine or a C_1–C_3 alkyl or alkoxy group, a phenyl group or a glycidyl group,

m is 0 or 1, and

n is an integer of 5 to 40.

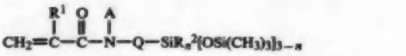
4,927,951

ORGANOSILICON COMPOUND

Keiji Kabeta, and Kiyoaki Syuto, both of Gunma, Japan, assignors to Toshiba Silicone Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1989, Ser. No. 424,394
Claims priority, application Japan, Nov. 30, 1988, 63-303070
Int. Cl.[5] C07F 7/10
U.S. Cl. 556—419 **6 Claims**

1. An organosilicon compound of the general formula:



where R^1 is a methyl group or hydrogen atom, R^2 is a substituted or unsubstituted monovalent hydrocargon group, Q is a divalent hydrocarbon group having 1–8 carbon atoms, A is a hydrogen atom, substituted or unsubstituted hydrocarbon group or $-QSiR_n^2[OSi(CH_3)_3]_{3-n}$, and n is an integer from 0–2.

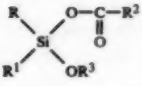
4,927,952

SILANOL CONDENSATION PRODUCTS

Jean Gueyne, and Marie-Christine Seguin, both of Monte-Carlo, Monaco, assignors to Exsymol S.A.M., Monte Carlo, Monaco

Filed May 24, 1988, Ser. No. 197,848
Claims priority, application France, May 26, 1987, 87 07371; Aug. 7, 1987, 87 11262
Int. Cl.[5] C07F 7/10
U.S. Cl. 556—419 **9 Claims**

1. A compound of the formula:



wherein: R and R^1 are alkyl groups, alkenyl groups, alkoxy groups, cycloalkyl groups, hydrocarbon aryl groups, unsubstituted or substituted with halogen, hydroxyl, acyl or alkoxy groups, or amide groups of up to 18 carbon atoms or hydroxy; R^2 and R^3 independently are alkyl groups, alkenyl groups, alkoxy groups, cycloalkyl groups, cycloalkenyl groups, hydrocarbon aryl groups or aryloxy groups of up to 18 carbon atoms or are linked to form a ring; and wherein at least one of the R^2 and R^3 groups contain an NH_2 or NH moiety.

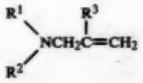
4,927,953

PROCESS FOR PREPARING AMINOPROPYL SILANES

Kazutoshi Takatsuna; Kouji Shiozawa, and Yoshiharu Okumura, all of Iruma, Japan, assignors to Tonen Corporation, Tokyo, Japan

Filed Sep. 11, 1989, Ser. No. 404,964
Claims priority, application Japan, May 31, 1989, 1-138181
Int. Cl.[5] C07F 7/10
U.S. Cl. 556—413 4 Claims

1. A process for preparing aminopropyl silanes which comprises reacting an allylamine of the formula [I]



[I]

wherein R^1 and R^2, each represents hydrogen, alkyl having from 1 to 10 carbon atoms, alkenyl having from 2 to 10 carbon atoms, phenyl, substituted phenyl, $-CH_2CH_2NHCH_2CH_2NH_2$ or $-CH_2CH_2NH_2$, and R^3 is hydrogen or alkyl having from 1 to 6 carbon atoms with a hydrosilane in the presence of a ruthenium compound having at least one tertiary phosphine ligand as a catalyst.

4,927,954

CONTINUOUS PROCESS FOR PRODUCING SECONDARY ALCOHOLS AND CARBOXYLIC ACID ESTERS

Robert J. Knopf, St. Albans; Louis F. Theiling Jr., Charleston, both of W. Va., and Leroy P. Berti, Houston, Tex., assignors to Union Carbide Chemicals and Plastics Company, Inc., Danbury, Conn.

Continuation of Ser. No. 198,245, May 25, 1988, abandoned, which is a continuation of Ser. No. 508,561, Jun. 28, 1983, abandoned. This application Apr. 19, 1989, Ser. No. 341,270
Int. Cl.[5] C07C 67/04, 67/02, 27/00
U.S. Cl. 558—441 15 Claims

1. A continuous process for co-producing secondary alcohols of long-chain olefins and lower carboxylic acid esters, comprising the steps of:

(A) passing a mixture of a long-chain α-olefin, and optionally the internal olefin isomers thereof, together with a lower carboxylic acid through a reaction zone in the presence of an amount sufficient to catalyze the conversion of said olefins and carboxylic acids to secondary alcohol carboxylates of an acidic heterogeneous catalyst under conditions at which the corresponding oxylation reaction will occur, thereby producing mixtures of isomeric secondary alcohol carboxylates;

(B) recovering the mixture of isomeric carboxylates produced in step (A);

(C) mixing the recovered carboxylates with a lower aliphatic alcohol in a pre-reaction zone in the presence of an amount sufficient to catalyze the pre-reaction of said carboxylates and lower aliphatic alcohol to said secondary alcohols of long-chain olefins and lower carboxylic acid esters of an ester exchange catalyst under conditions at which pre-reaction will occur;

(D) after the pre-reaction, passing the recovered carboxylates and a lower aliphatic alcohol, wherein the molar concentration of lower aliphatic alcohol is greater than the molar concentration of said carboxylates, through a reactive distillation still in the presence of an amount sufficient to catalyze the conversion of said carboxylates and lower aliphatic alcohol to said secondary alcohols of long-chain olefins and lower carboxylic acid esters of an ester exchange catalyst under conditions at which the ester exchange will occur, thereby producing, as co-products, secondary alcohols of said long-chain olefins and carboxylates of said lower aliphatic alcohols; and

(E) removing said carboxylates overhead and said secondary alcohols in the tails.

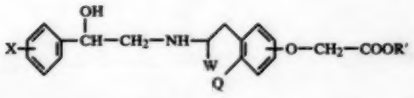
4,927,955

PROCESS FOR THE O-ALKYLATION OF N-(HYDROXY)ARALKYLPHENYLETHANOLAMINES

Robert Boigegrain, Castelnau Le Lez, France; Roberto Cecchi, Lodi-Milan, and Sergio Boveri, Tortona, both of Italy, assignors to Sanofi, Paris, France

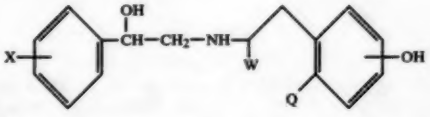
Filed Aug. 11, 1988, Ser. No. 230,860
Claims priority, application France, Aug. 12, 1987, 87 11498; Jun. 14, 1988, 88 07948
Int. Cl.[5] C07C 101/42
U.S. Cl. 560—45 6 Claims

1. A process for the preparation of compounds of formula



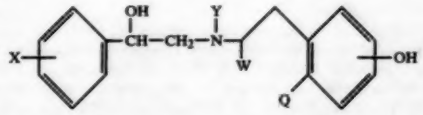
wherein X is hydrogen, halogen, a trifluoromethyl group or a lower alkyl group; W represents methyl, Q represents hydrogen or W and Q, together, form an ethylene group and R′ represents a lower alkyl group and of their pharmaceutically acceptable salts, which comprises

(a) protecting the amino group of a compound of formula



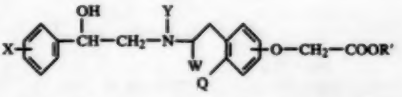
wherein X, W and Q are as defined hereinabove;

(b) submitting the compound thus obtained of formula



wherein X, W and Q are as defined hereinabove and Y is a N-protecting group, to an alkylation with a compound of formula Hal—CH_2—COOR′, wherein R′ is as defined hereinabove and Hal is chlorine, bromine or iodine;

(c) deprotecting the amino group of the compound thus obtained of formula



wherein X, Y, W, Q and R′ are as defined hereinabove; and optionally transforming the product thus obtained into one of its pharmaceutically acceptable salts.

4,927,956
3,5-DISUBSTITUTED-4-ACETOXYSTYRENE AND PROCESS FOR ITS PRODUCTION

Richard Vicari, Chatham Township, Morris County, N.J.; Mohammad Aslam, Corpus Christi; Wilson B. Ray, Beeville, both of Tex.; Kenneth G. Davenport, Hofheim, Fed. Rep. of Germany; Ralph Dummel, Mainz-Bretzenheim, Fed. Rep. of Germany; Juergen Lingnau, Mainz-Laubenheim, Fed. Rep. of Germany, and Karl-Friedrich Doessel, Wiesbaden, Fed. Rep. of Germany, assignors to Hoechst Celanese Corporation, Somerville, N.J.

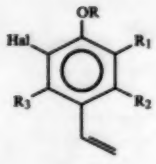
Division of Ser. No. 226,260, Aug. 2, 1988, which is a continuation-in-part of Ser. No. 97,809, Sep. 16, 1987, abandoned. This application Jun. 2, 1989, Ser. No. 360,803

Int. Cl.[5] *C07C 69/14*

U.S. Cl. 560—130 **5 Claims**

1. 3,5-disubstituted-4-acetoxystyrene wherein said substitution is independently C_1 to C_{10} alkyl or alkoxy, or amino.

3. 4-hydroxy- and 4-acetoxystyrene compounds having the formula:



wherein:

R is hydrogen or acetyl; and

Hal is chlorine or bromine; and

R1, R2 and R3 are independently hydrogen, alkyl, alkoxy, or halogen; and

wherein R1 and R2 may optionally be combined to form a cycloaliphatic ring, consisting of 6 to 12 members; and

wherein, when R is acetyl at least one of R_1, R_2 and R_3 and are not hydrogen, and when R is hydrogen, at least two of R_1, R_2 and . R_3 and are not hydrogen.

4,927,957
CATALYTIC DIMERIZATION OF ALKYL ACRYLATES

Robert Perron, Charly, and Sylvain Mutez, Irigny, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Aug. 19, 1988, Ser. No. 234,154

Claims priority, application France, Aug. 19, 1987, 87 11831

Int. Cl.[5] *C07C 67/465*

U.S. Cl. 560—202 **10 Claims**

1. A process for the preparation of an alkyl diester, comprising catalytically dimerizing at least one lower alkyl acrylate in the presence of a catalytically effective amount of palladium, tetrafluoroboric acid and a hydrogenophosphonium tetrafluoroborate, and wherein the palladium concentration ranges from 0.1 to 3 mmol per mole of said at least one alkyl acrylate, the reaction temperature ranges from 70° to 150° C. and the hydrogenophosphonium tetrafluoroborate concentration is at least 6 mmol per mole of said at least one alkyl acrylate.

4,927,958
STYRYL KETONES

Albert Fischli, Riehen, Switzerland; Eva-Maria Gutknecht, Buggingen-Seefelden, Fed. Rep. of Germany, and Daniel Obrecht, Basel, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

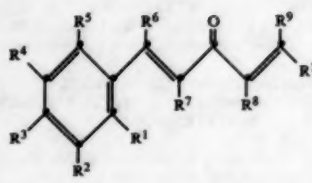
Filed Mar. 17, 1988, Ser. No. 169,570

Claims priority, application Switzerland, Mar. 20, 1987, 1071/87

Int. Cl.[5] *C07C 69/76*

U.S. Cl. 560—53 **26 Claims**

1. A compound of the formula



I

wherein R^1, R^2, R^3, R^4 and R^5 are independently hydrogen, halogen, lower alkyl, lower alkoxy-lower alkyl, hydroxy, lower alkoxy, lower alkenyloxy, lower alkynyloxy, lower alkoxy-lower alkoxy, acyloxy, aryl-lower alkoxy, lower alkylthio, lower alkoxy-lower alkythio, lower alkenylthio, lower alkynylthio, aryl-lower alkylthio, optionally substituted amino or trifluoromethyl or two of these substituents which are adjacent jointly and together with the carbon atoms to which they are attached form a 5- to 7-membered ring, provided that of the substituents R^1 to R^5 at least two are hydrogen and at least one is different from hydrogen; R^6 and R^7 are hydrogen or lower alkyl; R^8 and R^9 are hydrogen or lower alkyl or together represent an additional carbon-carbon bond; R^{10} is a group of the formula

$$-COOR^{11}, \quad -CONR^{12}R^{13}, \quad -C(R^{14})=O,$$

(a) (b) (c)

$$-C(R^{15})(OR^{16})_2, \quad -C(OR^{17})_3 \text{ or}$$

(d) (e)

$$-C(R^{18})(R^{19})OR^{20},$$

(f)

R^{11} is hydrogen, lower alkyl, lower alkenyl, lower alkoxy-lower alkyl, lower alkoxy-lower-alkoxy-lower alkyl, aryl or aryl-lower alkyl; R^{12} and R^{13} are hydrogen or lower alkyl or jointly and together with the nitrogen atom represent a 5- to 7-membered saturated heterocyclic group; R^{14} is lower alkyl, or aryl-lower alkyl; R^{15} is hydrogen, lower alkyl, aryl or aryl-lower alkyl; R^{16} is lower alkyl or lower alkoxy-lower alkyl; R^{17} is lower alkyl; R^{18} and R^{19} are hydrogen, lower alkyl, aryl or aryl-lower alkyl; and R^{20} is hydrogen, lower alkyl, lower alkoxy-lower alkyl, lower alkenyl, lower alkynyl, acyl or aryl-lower alkyl;

wherein the double bond(s) present in the molecule has (have) the E- and/or Z-configuration; or a pharmaceutically acceptable salt of an acidic compound of formula I with a base or of a basic compound of formula I with an acid.

4,927,959
ALPRENOLOL DERIVATIVES

Shinichi Shimada, Utsunomiya; Noboru Kawaguchi; Tadayoshi Koyama, both of Ishibashi; Akinori Wakaiki, Ishibashi; Keiji Hayashi, Ishibashi; Yasuyoshi Takeshita; Masamichi Nakakoshi, both of Utsunomiya, and Gosei Kawanishi, Ichikawa, all of Japan, assignors to Snow Brand Milk Products Co., Ltd., Sapporo, Japan

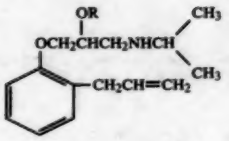
Filed Sep. 2, 1988, Ser. No. 239,663

Claims priority, application Japan, Sep. 4, 1987, 62-220268

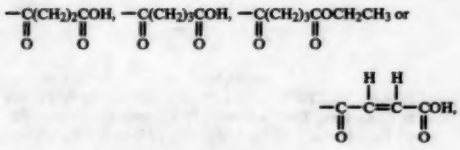
Int. Cl.[5] *C07C 69/353, 69/593*

U.S. Cl. 560—193 **5 Claims**

1. An alprenolol derivative of the formula:



wherein R is



and a hydrochloride thereof.

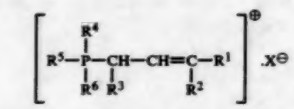
4,927,960

PHOSPHONIUM SALTS AND PROCESSES FOR PRODUCTION OF AND USES FOR THE SAME

Toshihiko Maeda; Yasuo Tokitoh, and Noriaki Yoshimura, all of Kurashiki, Japan, assignors to Kuraray Company, Ltd., Kurashiki, Japan

Filed Jun. 24, 1988, Ser. No. 211,034
Claims priority, application Japan, Jun. 24, 1987, 62-158290
Int. Cl.[5] C07C 53/00
U.S. Cl. 562—512 9 Claims

1. A phosphonium salt of the general formula



(I)

wherein R^1 and R^2 each is a hydrogen atom or a hydrocarbon group of 1 to 12 carbon atoms which may optionally be substituted, R^3 is a hydrogen atom or a hydrocarbon group of 1 to 5 carbon atoms which may optionally be substituted; R^4, R^5 and R^6 each is a hydrocarbon group of 1 to 8 carbon atoms which may optionally be substituted, at least one of R^4, R^5 and R^6 being an aryl group; X is a hydroxyl group, a hydroxycarbonyloxy group or a lower alkylcarbonyloxy group.

4,927,961

POLYOXYALKYLENE ETHER HAVING HYDROXYL AND SULFONATE GROUPS AND THEIR USE IN THE PREPARATION OF DISPERSABLE POLYURETHANES

Jürgen Fock, Dusseldorf, and Dietmar Schedlitzki, Essen, both of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 99,477, Sep. 22, 1987, Pat. No.
Claims priority, application Fed. Rep. of Germany, Oct. 1, 1986, 3633421
Int. Cl.[5] C07C 143/11
U.S. Cl. 562—103 7 Claims

1. Polyoxyalkylene ether with an average molecular weight of 400 to 10,000 and having at least two terminal hydroxyl groups and at least one —SO_3X group wherein X is hydrogen, alkali metal or ammonium ion, said polyoxyalkylene ether being the reaction product obtained by

(i) the statistical or blockwise addition of

(a) α-alkylene oxides with 2 to 14 carbon atoms or mixtures hereof, and

(b) allyl and/or methallyl glycidyl ethers,

to dihydric to quadrihydric aliphatic alcohols with up to 8 carbon atoms, the ratio of component (a) to component (b) being selected so that at least one allyl ether group is linked to the average molecule, and

(ii) reacting the polymer thus obtained with, based on the allyl ether groups, at least equimolar amounts of a compound of the formula HSO_3Y, wherein Y is alkali metal or ammonium ion.

4,927,962

PROCESS OF PREPARING FLUOROCARBON CARBOXYLIC OR SULFONIC ACID FROM ITS FLUORIDE

Minoru Aramaki; Hiroaki Sakaguchi, and Tamio Nakamura, all of Ube, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Aug. 29, 1988, Ser. No. 237,072
Claims priority, application Japan, Aug. 31, 1987, 62-215195; Aug. 31, 1987, 62-215197; Sep. 29, 1987, 62-242602
Int. Cl.[5] C07C 143/02, 51/42
U.S. Cl. 562—113 12 Claims

1. A process of preparing a fluorocarbon carboxylic acid represented by the formula $Rf(COOH)_m$, wherein Rf is a saturated or unsaturated perfluoroalkyl group having 1 to 10 carbon atoms, and m is 1 or 2, the process comprising the steps of:

(a) hydrolyzing a fluorocarbon carbonyl fluoride represented by the formula $Rf(COF)_m$ with water to thereby obtain an aqueous solution of said fluorocarbon carboxylic acid;

(b) mixing said aqueous solution with an aqueous solution of KOH to thereby obtain an aqueous solution in which a potassium salt of said fluorocarbon carboxylic acid is dissolved together with KF;

(c) partly evaporating water of the aqueous solution obtained at step (b) and thereafter cooling the solution to thereby precipitate said potassium salt from the solution and separating said potassium salt from the solution;

(d) adding a hydroxide of a metal selected from the group consisting of alkali metals except potassium and alkaline earth metals to the aqueous solution from which said potassium salt was separated to cause formation of KOH and precipitation of fluoride of said metal by reaction of said KF with said hydroxide and separating the precipitated fluoride from the solution;

(e) adding KOH to the aqueous solution from which the metal fluoride was separated and recycling the resultant aqueous solution of KOH to step (b); and

(f) subjecting the separated potassium salt obtained in step (c) to acid decomposition to thereby convert the potassium salt into said fluorocarbon carboxylic acid.

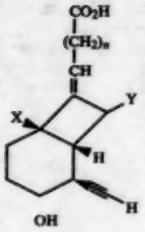
4,927,963

NOVEL PROCESSES FOR THE SYNTHESIS OF CERTAIN BICYCLO(4.2.0)OCTANE DERIVATIVES WITH VALUABLE THERAPEUTIC PROPERTIES

Keith A. M. Walker, Los Altos Hills, and Denis J. Kertesz, Mountain View, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Apr. 28, 1989, Ser. No. 346,425
Int. Cl.[5] C07C 62/32
U.S. Cl. 562—501 11 Claims

1. A compound, as a single stereoisomer or a mixture of stereoisomers, represented by the formula (10):



(10)

wherein:

X is hydrogen or lower alkoxy;

Y is hydrogen, exo-(lower alkyl) or endo-(lower alkyl); and n is an integer of 2–4.

4,927,964

METHOD FOR PRODUCTION OF 2-OXYIMINO-3-OXOBUTYRIC ACIDS

Kenzo Naito, Kyoto; Yukio Ishibashi, Osaka, and Haruo Shinbo, Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

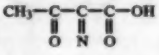
Filed Jan. 11, 1989, Ser. No. 295,510

Claims priority, application Japan, Jan. 18, 1988, 63-9271

Int. Cl.[5] C07C *131/00*

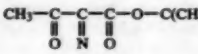
U.S. Cl. 562—560 8 Claims

1. A method of producing a 2-substituted oxyimino-3-oxobutyric acid of the formula:



OR

wherein R is a hydrogen atom or a straight or branched alkyl group having 1 to 4 carbon atoms which may be substituted with one or two members of the group selected from a carboxyl group, C_{1-4} alkoxy-carbonyl group, a cycloalkyl group of 3 to 6 carbon atoms and a five-membered heterocyclic group, which comprises reacting a tert-butyl 2-substituted oxyimino-3-oxobutyrate of the formula:



OR

wherein R is as defined above, with a hydrogen halide in an anhydrous organic solvent.

4,927,965

N-(N-SUCCINYL-L-LEUCYL)AGMATINE, RELATED COMPOUNDS AND USE IN PHARMACOLOGY

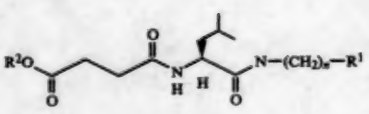
Gabriel F. Eilon, Wyndmoor, and Wayne J. Thompson, Green Lane, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 3, 1988, Ser. No. 266,609

Int. Cl.[5] C07C *129/12, 125/065*

U.S. Cl. 562—560 5 Claims

1. Compounds having the formula:



(1)

wherein R^1 is $-NH(C=O)OR^5$, $-NH(C=NH)NH_2$ or $-NH(C=N-NO_2)HN_2$; R^2 is hydrogen. C_{1-8}alkyl or C_{6-8}aryl; n is 2 to 6; and R^5 is hydrogen, C_{1-8}alkyl, C_{6-8}aryl, or C_{7-8}alkaryl.

4,927,966

2-MERCAPTOMETHYLGLUTARIC ACID DERIVATIVES

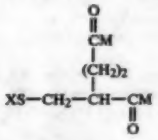
Thomas I. Kalman, East Amherst, N.Y., assignor to The Research Foundation of State University of New York, Albany, N.Y.

Filed Jun. 4, 1987, Ser. No. 58,035

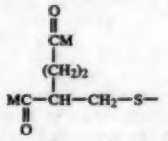
Int. Cl.[5] C07C *55/12, 149/20*; C07F *1/12, 15/04*

U.S. Cl. 562—594 16 Claims

1. A compound of the formula:



wherein X is selected from hydrogen, R'C—and R"—; R' is selected from alkyl, alkenyl, alkynyl, substituted and unsubstituted aryl; R" is selected from



and R'S; M is selected from OR and secondary amine; and R is selected from hydrogen, alkyl, acyloxymethyl, substituted and unsubstituted aryl, amino cation and metal cation.

4,927,967

PRODUCTION OF CARBOXYLIC ACIDS FROM ORGANIC FORMATE ESTERS USING RHODIUM COMPLEX CATALYSTS

Richard W. Wegman, South Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 632,837, Jul. 20, 1984, abandoned. This application Nov. 6, 1985, Ser. No. 794,603

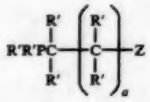
Int. Cl.[5] C07C *51/353, 53/08*

U.S. Cl. 562—607 19 Claims

1. A process for the production of organic carboxylic acids of the formula RCOOH which comprises the catalytic reaction of organic formate esters of the formula HCOOR in contact with carbon monoxide and a homogeneous catalyst system consisting essentially of a rhodium metal atom component, a phosphorus containing ligand in which there is present at least one oxo oxygen atom attached to a phosphorus atom or a carbon atom to form a Z group and

in said Z group is located at least one carbon atom removed from the phosphorus atom of the molecules represented by the formulas:

(V)



or

(VI)

and a halogen source; wherein R is an alkyl group having from 1 to 30 carbon atoms, or aryl or aralkyl groups having 6 to 10 ring carbon atoms with from 1 to 10 carbon atoms in the alk-moiety thereof, or alkenyl having from 2 to 30 carbon atoms; R′ is H, aryl or aralkyl having from 6 to 10 ring carbon atoms and the alkyl moiety of said aralkyl group having 1 to 10 carbon atoms, or an alkyl group having from 1 to 10 carbon atoms; and wherein 1 or more of said R′ groups can be substituted with a Z group but not more than 3 of said R′ groups in the molecule are so substituted; a is an integer form 0–4; b is an integer from 0–3; and Z is a member selected from the group consisting of:

wherein R″ is R′ or H and said reaction is carried out at a reaction temperature up to about 170° C. and a reaction pressure up to about 450 psig.

4,927,968

CHEMICAL INTERMEDIATES AND PROCESS

Aldo A. Algieri, Killingworth, Conn., and Robert F. Farney, Evansville, Ind., assignors to Bristol-Myers Company, New York, N.Y.

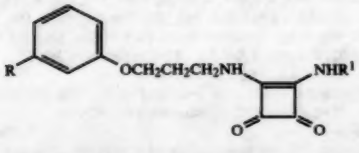
Continuation-in-part of Ser. No. 50,459, May 14, 1987, abandoned. This application Apr. 11, 1988, Ser. No. 174,444

Int. Cl.[5] C07C *93/06*

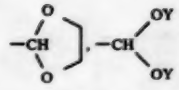
U.S. Cl. 549—451 **5 Claims**

1. A compound of the formula

I



wherein R^1 is hydrogen or lower alkyl and R is —CHO,



—CH_2OH or —CH_2X in which X is a conventional leaving group and Y is lower alkyl.

4,927,969

PREPARATION OF ALKYL PRIMARY AMINES

Charles F. Kahle, II, Allison Park; Gregory J. McCollum, Gibsonia, and Craig A. Wilson, Bakerstown, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 2, 1988, Ser. No. 187,786

Int. Cl.[5] C09C *85/20*

U.S. Cl. 564—377 **14 Claims**

1. A process of preparing an alkyl primary amine comprising:

(a) reacting an alkyl isocyanate with an alkanolamine characterized as containing either primary or secondary amine functionality to form a urea reaction product;

(b) heating the urea reaction product for time and at temperatures sufficient to decompose the urea reaction product and form a mixture including an alkyl primary amine; and

(c) continuously separating the alkyl primary amine from the reaction mixture formed in step (b).

4,927,970

SUBSTITUTED 3-CYCLOBUTENE-1,2-DIONE INTERMEDIATES

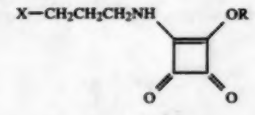
James L. Douglas, Montreal West, Canada; Guy Fabre, Saint Jean de Vadas, and Claude Demosthene, Aramon, both of France, assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 50,670, May 14, 1987, abandoned. This application Apr. 11, 1988, Ser. No. 174,443

Int. Cl.[5] C07C *87/36, 87/452*

U.S. Cl. 564—462 **10 Claims**

1. A compound of the formula



wherein R is lower alkyl or cyclohexyl, X is hydroxy, halogen or —SO_3R^4 and R^4 is lower alkyl, trifluoromethyl, phenyl or substituted phenyl in which said substituent may be methyl, chloro, bromo, methoxy or nitro.

4,927,971

DESENSITIZER COMPOSITION

Mitsuru Fuchigami; Shingo Tachizawa, both of Takasago, and Mamoru Ishiguro, Tokyo, all of Japan, assignors to Mitsubishi Paper Mills Ltd., Tokyo, Japan

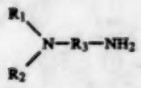
Filed May 8, 1989, Ser. No. 348,687

Claims priority, application Japan, May 11, 1988, 63-115724; May 11, 1988, 63-115725; May 11, 1988, 63-115726; Jun. 7, 1988, 63-141264; Jul. 22, 1988, 63-183100; Dec. 28, 1988, 63-335233

Int. Cl.[5] C07C *93/04*

U.S. Cl. 564—505 **8 Claims**

1. A desensitizing ink comprising an adduct produced by the addition of 4 to 70 mols of an alkylene oxide to 1 mol of an amine represented by the general formula (I) where 40 mol % or more of said alkylene oxide are butylene oxide:

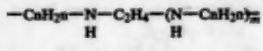


(I)

where R_1 and R_2 represent hydrogen atoms or an alkyl group having 1 to 20 carbon atoms;

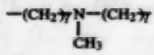
when both R_1 and R_2 are hydrogen atoms, R_3 represents a branched alkylene having 3 to 9 carbon atoms,

or a substituted alkylene represented by the general formula (II) or (III):



(II)

where m is 0 or 1, n is an integer of 3 to 6,



(III)

where l is an integer of 1 to 4,

when at least either R_1 or R_2 is an alkyl group having 1 to 20 carbon atoms, R_3 represents an alkylene group represented by the general formula (IV):

(IV)

where q is an integer of 1 to 12.

4,927,972

CATALYTIC PROCESS FOR THE PRODUCTION OF MERCAPTANS FROM THIOETHERS

Emmanuel F. E. Arretz, Pau, France, assignor to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

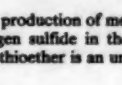
Continuation of Ser. No. 93,640, Sep. 8, 1987, abandoned. This application Dec. 12, 1988, Ser. No. 284,767

Claims priority, application France, Sep. 11, 1986, 8612690

Int. Cl.[5] C07C *148/00*

U.S. Cl. 568—70 **11 Claims**

1. A process for the production of mercaptans by reacting a thioether with hydrogen sulfide in the presence of an acid catalyst, wherein said thioether is an unsymmetrical thioether of the formula:



where the symbols R^1, R^2 and R^3, alike or different, are C_1–C_{18} alkyl groups, Q^1 is an unsubstituted or COOH-substituted C_1–C_{18} alkyl group, and Q^2 is a hydrogen atom or a C_1–C_{18} alkyl group, said acid catalyst is selected from the aluminosilicates and the cation-exchange resins, the reaction being effected under a pressure of about 5 to 30 bars at a temperature between 80° and 200° C.

4,927,973

PROCESS FOR CONTINUOUS PURIFICATION OF BISPHENOLS

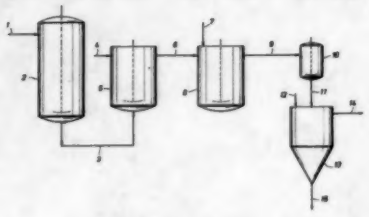
Walter Dong, Gold River, Calif.; Paul V. Shaw, and James L. Buechele, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 16, 1988, Ser. No. 285,254

Int. Cl.[5] C07C *37/84, 37/68*

U.S. Cl. 568—724 **5 Claims**

1. A process for the continuous purification of crude bisphenol which comprises (1) forming a single liquid phase comprising a hot mixture of crude bisphenol and water in a ratio substantially of from about 75% to about 85% weight of crude bisphenol to about 15% to about 25% weight water; (2) continuously feeding this mixture together with a stream of warm water to a first crystallization zone at a temperature of the combined streams sufficient to maintain a bisphenol-rich liquid



phase, a water-rich phase and a crystalline phase comprising about 70% to about 95% of the total bisphenol in the mixture; (3) passing the three-phase mixture of bisphenol and water to a second crystallization zone operated at about 85° C. to about 97° C. until about 90% to about 99% of the total bisphenol is crystallized; and (4) recovering the purified bisphenol crystals.

4,927,974

PROCESS FOR THE PREPARATION OF CYCLOHEXANOL AND/OR CYCLOHEXANONE

Paul C. van Geem, Beek, and Franciscus T. B. van den Brink, Geldrop, both of Netherlands, assignors to Stamicarbon B.V., AC Geleen, Netherlands

Filed Apr. 6, 1989, Ser. No. 334,142

Claims priority, application Netherlands, Apr. 21, 1988, 8801036

Int. Cl.[5] C07C *45/32*

U.S. Cl. 568—357 **5 Claims**

1. Process for the preparation of cyclohexanol and/or cyclohexanone, in which cyclohexene in a feed stream containing cyclohexene, cyclohexane and benzene is hydrated into cyclohexanol and/or oxidized into cyclohexanone, the cyclohexanol and/or cyclohexanone obtained is separated from the reaction mixture thus obtained and the remaining cyclohexane and benzene are recycled to a preconnected cyclohexene preparation section, wherein part of the stream that is recycled to the cyclohexene preparation section is subjected to a dehydrogenation reaction and the remaining part to a hydrogenation reaction and the reaction streams thus obtained are combined to form the feed stream to the hydration and/or oxidation step.

4,927,975

PROCESS FOR PREPARING CERTAIN DECAHYDRO-7H-3-OL-7-ONES

Marie-Madeleine Bouton; Jean Jacques, both of Paris, and André Pierdet, Noisy-Le-Sec, all of France, assignors to Roussel Uclaf, Paris, France

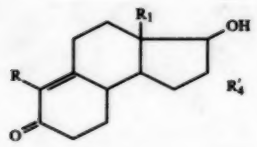
Division of Ser. No. 855,905, Apr. 24, 1986, Pat. No. 4,849,454, which is a division of Ser. No. 543,315, Oct. 19, 1983, Pat. No. 4,607,054, which is a continuation-in-part of Ser. No. 350,151, Feb. 19, 1982, Pat. No. 4,466,971. This application Jul. 25, 1988, Ser. No. 223,636

Claims priority, application France, Feb. 23, 1981, 81 04630

Int. Cl.[5] C07C *49/403, 49/497, 49/603*

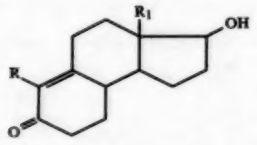
U.S. Cl. 568—373 **5 Claims**

1. A process for the preparation of a compound which has the formula



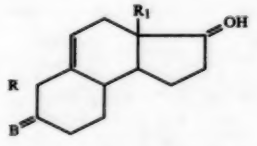
I_B'

wherein R is alkyl of 1 to 4 carbon atoms and R_1 is methyl or ethyl and R_4 is alkyl of 1 to 4 carbon atoms comprising reacting a compound of the formula



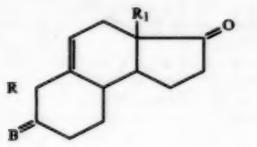
II_B

wherein R and R_1 have the above definition with a ketone protecting reactant to obtain a compound of the formula



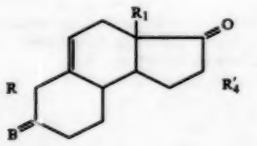
III_B

wherein R is a ketal, enamine or enol ether and the dotted line is a double bond when B is an enamine or enol ether, reacting the latter with an oxidation agent selected from the group consisting of pyridinium dichromate, sulfochromic acid solution, pyridinium chlorochormate, chromium trioxide in pyridinium, aluminum isopropoxide and aluminum tertiary butoxide to obtain a compound of the formula



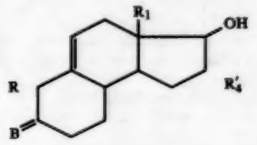
V_B

treating the latter with an iodide of the formula R_4 I in the presence of a strong base to form a compound of the formula



V_B

reacting the latter with a reducing agent selected from the group consisting of lithium aluminum hydride, sodium borohydride, potassium borohydride, and lithium borohydride to obtain a compound of the formula



V_B'

and treating the latter to remove the ketone protecting group to obtain the compound of formula I_B.

4,927,976

PROCESS FOR PREPARING 2,3-BIS(HYDROXYETHOXYMETHYL) BICYCLO [2,2,1] HEPTANE AND POLYESTER THEREWITH

Kou-Chang Liu, Wayne, N.J., assignor to GAF Chemicals Corporation, Wayne, N.J.

Filed Sep. 5, 1989, Ser. No. 402,370
Int. Cl.[5] C07C *43/02*
U.S. Cl. 568—665 **1 Claim**

1. The compound 2,3-bis(hydroxyethoxymethyl) bicyclo [22,1] heptane.

4,927,977

PROCESS AND APPARATUS FOR THE UNIFORM DISTRIBUTION OF A TWO-PHASE FEED IN A CHEMICAL REACTION ZONE

Jonathan E. Child, Sewell; Byung C. Choi, and Francis P. Ragonese, both of Cherry Hill, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,093
Int. Cl.[5] C07C *41/05, 24/04*
U.S. Cl. 568—695 **13 Claims**

1. In a process for chemically converting a two-phase feed containing at least one liquid component and at least one gaseous component in the reaction zone of a tube of a tubular reactor to provide one or more reaction products, the improvement which comprises:

(a) adjusting the temperature of a two-phase feed as required to convert said feed into a single liquid or gaseous phase reaction mixture;

(b) substantially uniformly distributing each component of the reaction mixture therein;

(c) readjusting the temperature of the substantially uniform single phase reaction mixture to substantially correspond to the temperature within the reaction zone of a tube; and,

(d) introducing the temperature-adjusted reaction mixture into the reaction zone of said tube.

4,927,978

METHOD OF PURIFYING BISPHENOLS

James L. Buechele; Edward L. Nielsen, both of Houston, Tex.; Walter Dong, Gold River, Calif., and Paul V. Shaw, Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 16, 1988, Ser. No. 285,253
Int. Cl.[5] C07C *37/84, 37/68*
U.S. Cl. 568—724 **29 Claims**

1. A process for the preparation of crystals of an adduct of a bisphenol with a phenol which comprises:

(a) adding 8–25% weight of an inert volatile liquid aliphatic hydrocarbon diluent and 0 to about 1.5% w water to a crude mixture of the bisphenol and the phenol at a temperature above the boiling temperature of the added volatile liquid diluent; and

(b) allowing the volatile liquid diluent to boil in the process thereby cooling the resulting mixture to a temperature at which crystals of the adduct form.

4,927,979

PROCESS FOR THE PREPARATION OF P-ETHYLPHENOL

Takanori Yamagishi, Ichihara; Tsutomu Idai, Noda, and Eiji Takahashi, Chiba, all of Japan, assignors to Maruzen Petrochemical Co., Ltd., Tokyo, Japan

Filed Dec. 6, 1988, Ser. No. 280,692

Claims priority, application Japan, Dec. 18, 1987, 62-321002; Jun. 24, 1988, 63-154628

Int. Cl.[5] C07C 37/14, 37/11

U.S. Cl. 568—791 20 Claims

1. In a process for the preparation of a mixture of ethylphenol isomers which comprises reacting phenol with an ethylating agent selected from the group consisting of ethylene and ethanol in the vapor phase in the presence of a catalyst at a temperature of 200°–600° C. under a pressure of not higher than 10 Kg/cm^2.G, the improvement which comprises that said mixture of ethylphenol isomers has a p-ethylphenol content of higher than about 80 wt. % and said catalyst comprises a crystalline aluminosilicate catalyst obtained by incorporating one or more alkoxysilanes represented by the formula $R'_nSi(OR)_{4-n}$ wherein OR represents an alkoxy group having 1–6 carbon atoms, R' represents an alkyl group having 1–6 carbon atoms or a phenyl group and n represents an integer of 0–3, on a crystalline aluminosilicate having a constraint index of 1–15 and a silica/alumina molar ratio of 20–400, the amount of said incorporated alkoxysilanes being not less than 1.4 wt. % calculated as elemental silicon based on the amount of said crystalline aluminosilicate.

4,927,980

CATALYTIC METHOD FOR PRODUCING FLUOROAROMATIC COMPOUNDS USING BRANCHED ALKYL PYRIDINIUM SALTS

Gary L. Cantrell, Belleville, Ill., assignor to Mallinckrodt Inc., St. Louis, Mo.

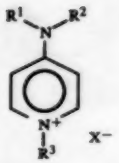
PCT No. PCT/US87/02829, § 371 Date Feb. 9, 1987, § 102(e) Date Feb. 9, 1987, PCT Pub. No. WO87/04148, PCT Pub. Date Jul. 16, 1987

Continuation-in-part of Ser. No. 816,479, Jan. 6, 1986, abandoned. This PCT application Dec. 30, 1986, Ser. No. 146,259

Int. Cl.[5] C07C 79/12

U.S. Cl. 568—937 11 Claims

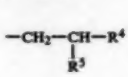
1. In a process for preparing a fluoroaromatic compound by reaction of a corresponding chloroaromatic compound with potassium fluoride under halide-exchange conditions in the presence of a catalyzing amount of a phase transfer catalyst, the improvement which comprises using as said catalyst an N-(2-branched-alkyl)-diorganoaminopyridinium salt represented by the formula



where:

R^1 and R^2 are monovalent or divalent organo radicals independently selected from substituted and unsubstituted hydrocarbon radicals having from 1 to 13 carbon atoms and divalent alkylene radicals which together can be part of a cyclic structure forming a ring having from 4 to 8 carbon atoms;

R^3 is a monovalent organo radical having from 4 to 18 carbon atoms and the formula



where R^4 and R^5 are independently selected alkyl radicals each having from 1 to 8 carbon atoms; and X- is an anion selected from the group consisting of fluoride, bromide and chloride, and

adding the phase transfer catalyst to the chloro-aromatic compound in one step.

4,927,981

MANUFACTURE OF CHLOROFORM

Kung H. Lee, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 119,397, Nov. 10, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 257,355

Int. Cl.[5] C07C 17/22

U.S. Cl. 570—255 9 Claims

1. A process for the manufacture of chloroform by the partial clorination of methyl chloride and methylene chloride mixtures, which process comprises

providing an initial feed mixture consisting essentially of chlorine, methyl chloride and methylene chloride in amounts such that the mol ratio of chlorine to said chlorinated methanes is in the range of from about 0.15:1 to about 0.21:1 and the mol ratio of methyl chloride to methylene chloride is about 1.5:1;

feeding said mixture at a pressure of about 13 to 130 atmospheres to a reactor that minimizes backmixing of the mixture components and heating said mixture to a temperature in the range of from about 220° to about 500° C. at which reaction of the chlorine with the chloromethanes in the feed mixture is initiated;

maintaining said reaction under said conditions until substantially all the chlorine has reacted;

recovering a chlorinated product mixture containing chloroform, methyl chloride, methylene chloride and little or no carbon tetrachloride, the amount of methylene chloride produced being no more than 0.1 mol per mol of chloroform produced and the amount of carbon tetrachloride corresponding to less than 0.1 mol of carbon tetrachloride per mol of chloroform in the product; and

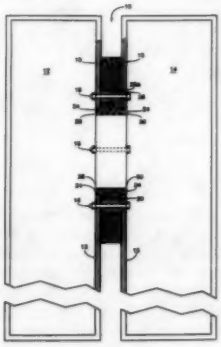
separating chloroform from the product mixture.

ELECTRICAL

4,927,982
WIRE CHANNEL BUSHING AND ELECTRICAL ENCLOSURES COUPLED THEREWITH

Donald C. Wight, Marysville, and Keith T. Krueger, Bellefontaine, both of Ohio, assignors to Siemens Energy & Automation, Inc., Atlanta, Ga.

Filed Apr. 7, 1989, Ser. No. 334,965
Int. Cl.[5] H02G *3/08*
U.S. Cl. 174—50 5 Claims



1. An apparatus for providing a channel between electrical enclosures, the apparatus comprising:

an insulating bushing member having first and second ends, a side wall spanning therebetween, a generally circular channel passing from the first end to the second end through the bushing member, a first shoulder bordering the channel at the first end, a second shoulder bordering the channel at the second end, and at least one mounting hole in the bushing member for mounting the bushing member between the enclosures; and

at least two conductive sleeves being generally cylindrical and including an opening adapted to accept a fastener, the sleeves being carried by the bushing member exteriorly of the channel and in spaced relation to the mounting hole for providing grounding paths between the electrical enclosures, the sleeves extending from the first end through the bushing member to the second end;

wherein the electrical enclosures each include a wall having an opening, and each shoulder is adapted to extend into one opening.

4. An electrical enclosure assembly comprising:

a pull box including a first wall having a first opening;

a termination box including a second wall having a second opening;

an insulating bushing fixed between the first wall and the second wall such that a channel is provided between the first opening and the second opening, the insulating bushing including a first shoulder bordering the channel and extending into the first opening, and a second shoulder bordering the channel and extending into the second opening;

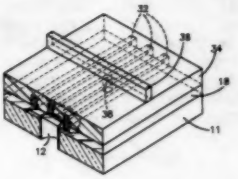
a plurality of fasteners fixing the insulating bushing between the first wall and the second wall; and

at least two conductive sleeves being generally cylindrical and including an opening adapted to accept a fastener, the sleeves being carried by the insulating bushing exteriorly of the channel and in spaced relation to the fasteners, the sleeves extending from the first wall to the second wall for providing grounding between the pull box and the termination box.

4,927,983
CIRCUIT BOARD

Alan L. Jones, Endwell; Keith A. Snyder, and Paul E. Winkler, both of Vestal, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 16, 1988, Ser. No. 286,593
Int. Cl.[5] H05K *1/00*
U.S. Cl. 174—258 7 Claims



1. An improved printed circuit board which board comprises an insulating core having plated through holes;

electrical circuitry on at least one side thereof which circuitry includes lands connected to said plated through holes;

a permanent dielectric material on said at least one side of said board covering the circuitry and the plated through holes,

vias extending through said permanent dielectric material to communicate with circuitry connected to said plated through holes;

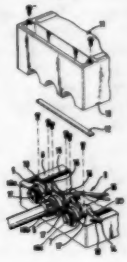
electrical circuit lines on said permanent dielectric material at least a portion of which circuit lines overlies said plated through holes and is insulated therefrom;

said vias connecting said electrical circuit lines to said circuitry on said core.

4,927,984
PROTECTIVE HOUSING FOR CABLE JOINTS

Karl-Heinz Meislitzer, Löhne/Gohfeld, and Heinz Sandmann, Uchte, both of Fed. Rep. of Germany, assignors to Rose Elektrotechnik GmbH & Co. KG, Porta Westfalica, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 256,303
Claims priority, application Fed. Rep. of Germany, Oct. 14, 1987, 37351710
Int. Cl.[5] H02G *15/113*
U.S. Cl. 174—92 8 Claims



1. A housing assembly for a cable splicing joint in a cable system comprising upper and lower housing sections having upper and lower separation faces thereon, said upper and lower housing sections being joined along said upper and lower separation faces, said upper and lower separation faces including upper and lower front separation face portions hav-

ing upper and lower recesses therein, respectively, which cooperate to define a cable accepting inlet aperture, a cable socket removably received in said cable accepting inlet aperture, said cable socket having an internal inlet opening therein, internal seal means in said internal inlet opening for sealing between said socket and a cable received in said internal inlet opening, said socket having an outer circumferential sealing face thereon, and non-adhesive sealing strip means for sealing between said upper and lower separation faces and between said upper and lower recesses and said sealing face, said sealing strip means including upper and lower seamless, unbroken non-adhesive sealing strips which extend along the entire extents of said upper and lower front separation face portions, respectively, and the upper and lower recesses therein, respectively, for sealing between said upper and lower front separation face portions and between said recesses and said sealing face.

4,927,985

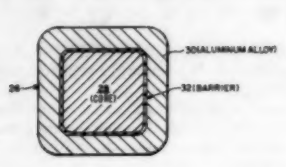
CRYOGENIC CONDUCTOR

Nataraj C. Iyer, Monroeville; Walter J. Carr, Jr., Wilkins Twp., Allegheny County, and Alan T. Male, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 12, 1988, Ser. No. 231,040

Int. Cl.[5] H01B *12/00*

U.S. Cl. 174—125.1 **23 Claims**



1. A lightweight composite hyperconductor which resists power and efficiency losses due to transverse eddy currents while conducting alternating current and comprises:

cryogenic conducting means in the form of a hard and ductile hyperconductor;

matrix means surrounding said conducting means and consisting essentially of a metal or alloy of higher strength than said conducting means; and

barrier means disposed between said conducting means and said matrix means and consisting of a layer of barrier material of high electrical resistivity for electrically insulating said conducting means from said matrix means, preventing diffusing contamination of said conducting means from said matrix means and conducting heat between said matrix means and said conducting means to enable uniform cooling of said composite hyperconductor to cryogenic temperatures, said barrier material retaining these properties both during and after high temperature processing of said composite hyperconductor.

4,927,986

CONDUCTIVE STYLUS STORAGE FOR A PORTABLE COMPUTER

John J. Daly, San Carlos, Calif., assignor to GRID Systems Corporation, Fremont, Calif.

Filed Jun. 12, 1989, Ser. No. 364,951

Int. Cl.[5] G08C *21/00*

U.S. Cl. 178—18 **18 Claims**

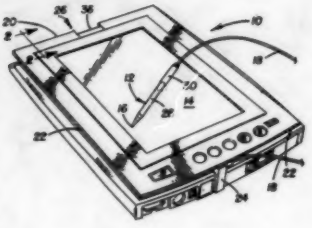
1. A system for retention of a stylus on a housing comprising:

a stylus;

a housing having channel in one edge of the computer, providing a recess within which the stylus can be laterally inserted for storage, at a storage position;

a tethering cord connected to the housing and to the stylus; the length of the tethering cord being just sufficient to allow the stylus to be inserted into said storage position with the tethering cord wrapped around the housing, from its point of connection to the housing to the stylus; and

the stylus having a smaller diameter portion and a larger diameter portion, and the housing's channel being sized to



receive the smaller diameter portion of the stylus, and having an enlarged slot area slightly longer than the enlarged diameter portion of the stylus and configured to receive the larger diameter portion to thereby positively locate the position of the stylus when it is inserted into the storage position in the housing's channel.

4,927,987

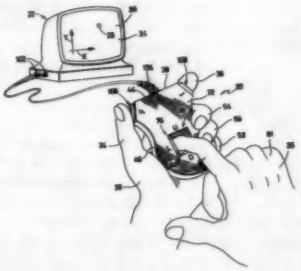
DIRECTIONAL CONTROL DEVICE

Steven J. Kirchgessner, 7845 Greenbriar Rd., Talbot, Tenn. 37877

Filed Feb. 24, 1989, Ser. No. 315,522

Int. Cl.[5] H01H *9/00*

U.S. Cl. 200—5 R **16 Claims**



1. A directional control device comprising:

a body having a recess for loosely receiving the finger of a user inserted endwise therein, said recess including sides which collectively provide an opening through which the user's finger can be operatively inserted and which opening accommodates the insertion of substantially the entire length of the user's finger; and

switch means associated with said sides including at least one directional switch which can be actuated by a depressing action, said directional switch being supported adjacent a side of said opening and adjacent the entrance to said opening for actuation with the user's finger so that by inserting his finger through the opening, the user is permitted to actuate the switch with substantially any part of his finger remote of the fingertip, and

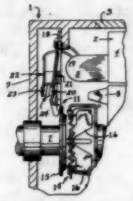
the smallest distance as measured across the opening is at least about one inch so that when the user's finger is centered within the opening, the finger is spaced from the sides of the recess.

4,927,988

ENCLOSED SWITCH CONTACT ASSEMBLY

Duane R. Nolte, Wausau, Wis., assignor to Marathon Electric Mfg. Corp., Wausau, Wis.

Filed Jan. 23, 1989, Ser. No. 300,324
Int. Cl.[5] H01H 35/10
U.S. Cl. 200—80 R 12 Claims



1. In a dynamoelectric machine having a winding adapted to be selectively connected and disconnected from circuit in response to the speed of the machine, a switch assembly comprising a first contact, a second contact, means connecting said contacts in circuit with said winding, a relatively fixed mounting plate, said first contact being secured to said mounting plate and said plate having a flat planar surface surrounding said contact, a movable contact arm mounted in opposed aligned relation with said first contact, means securing said second contact to said movable arm in opposed aligned relation to said first contact, each of said contacts having an outer cylindrical periphery, a single piece tubular boot having opposite cylindrical tubular end portions and an intermediate convoluted portion defining at least one generally C-shaped deflection portion, said boot having a first end portion telescoped over said second contact and secured to the periphery of said second contact for movement therewith, said boot projecting from said second contact and having said second end portion telescoped over said first contact into compressive abutting engagement with said planar surface of said mounting plate.

4,927,989

CONTACT MATERIAL FOR VACUUM CIRCUIT BREAKER

Eizo Naya; Mitsuhiro Okumura, both of Amagasaki, and Seiichi Miyamoto, Marugame, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 2,239, Jan. 12, 1987, abandoned. This application Apr. 11, 1989, Ser. No. 336,517
Claims priority, application Japan, Jan. 10, 1986, 61-3763; May 9, 1986, 61-107208
Int. Cl.[5] H01H 1/02
U.S. Cl. 200—265 12 Claims

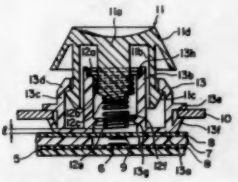
1. A contact material for a vacuum circuit breaker, characterized in that it consists essentially of copper, molybdenum, niobium, and one or more kinds of low melting point materials selected from the group consisting of bismuth, tellurium, antimony, lead and thallium.

4,927,990

SPRING-BIASED PUSH-BUTTON SWITCH HAVING A SPRING-LOADED TACTILE FEEDBACK FEATURE

Kazuo Aoki; Toshimi Chiba; Sadao Tachibana, and Yasushi Nagatomo, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 3, 198>, Ser. No. 319,140
Claims priority, application Japan, Mar. 31, 1988, 63-41829[U]
Int. Cl.[5] H01H 13/28
U.S. Cl. 200—517 15 Claims



1. In a push-button switch including:

a substrate;

a fixed electrode provided on the substrate;

a movable electrode disposed opposite to the fixed electrode;

a key housing having a base and a tubular spring retainer projecting from a central portion of the base, said tubular spring retainer having an inner shoulder formed in an end thereof opposite said base, and an annular guide wall surrounding the tubular spring retainer and having a stopping flange extending substantially radially inwardly from an end thereof opposite said base;

a coil spring received in the tubular spring retainer of the key housing with a portion thereof opposite said base seated on a surface defined by the shoulder and facing away from said base; and

a key for operating the movable electrode, having a key head, a central stem extending from a central portion of a lower surface of the key head so as to be inserted in the coil spring, and legs formed around the stem so as to extend from the lower surface of the key head, each said leg being provided at a free end thereof with a tapered claw, said key being axially slidably fitted in the key housing with the stem axially received in the coil spring in the tubular spring retainer and with the tapered claws of the legs disposed radially between said tubular spring retainer and said annular guide wall, and engaging the stopping flange of the annular guide wall;

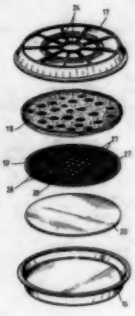
the improvement wherein the coil spring comprises a large coil section seated on said shoulder, a middle extension coil section, and a small compression coil section, which are formed integrally in that order from said shoulder to said base, a radially inwardly directed protrusion is formed on a radially inner surface of the tubular spring retainer, and said small compression coil section includes a radially outwardly projecting part which engages a surface of the protrusion facing away from said base while the key is not depressed, the projecting part of the coil spring snapping across the protrusion toward said base when the key is depressed extending the middle extension coil section and compressing the small compression coil section, and the projecting part being caused to snap back across the protrusion by the contractive force of the middle extension coil section and the recoiling force of the small compression coil section when the key is released.

4,927,991

SUSCEPTOR IN COMBINATION WITH GRID FOR MICROWAVE OVEN PACKAGE

Dan J. Wendt, Lino Lakes; Jonathon D. Kemske, New Brighton, and Peter S. Pesheck, Brooklyn Center, all of Minn., assignors to The Pillsbury Company, Minneapolis, Minn.

Filed Nov. 10, 1987, Ser. No. 119,381
Int. Cl.[5] H05B *6/80*
U.S. Cl. 219—10.55 E 33 Claims



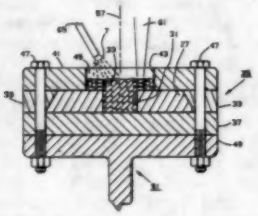
1. A food package for a microwave oven, comprising:
a first sheet of material defining susceptor means for heating in response to microwave radiation;
a second sheet of material defining a grid, the grid having a conductive surface surrounding transmissive apertures, the grid modifying the performance characteristics of the susceptor means, the grid being in close proximity to the susceptor means;
a food item, the food item being located in heating relationship with the susceptor means; and,
the grid and the susceptor being located on the same side of the food item.

4,927,992

ENERGY BEAM CASTING OF METAL ARTICLES

Graham A. Whitlow, Murrysville; Gerald J. Bruck, Library, and James E. Smith, Delmont Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 4, 1987, Ser. No. 21,856
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.65 14 Claims



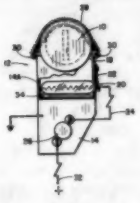
1. A method of producing articles from powder metal comprising the steps of:
generating a focused energy beam having an energy density sufficient to melt the powder metal;
generating relative movement between the energy beam and a substrate such that the energy beam repetitively traces over the substrate the shape of said article and melts the surface of the substrate at the interface of the energy beam and the substrate; and
feeding powder metal onto said substrate to maintain a depth of powder metal which laterally supports and forms a mold for a layer of powder metal at the energy beam interface which is melted by the energy beam, the thickness of the layer of powder metal being such that the energy beam penetrates the layer of powder metal and melts the surface of the substrate but only to the extent to wet the substrate sufficiently to bond to the substrate the melted powder metal, which in turn, cools rapidly upon leaving the energy beam interface to form a thick layer of the article which becomes the substrate for the next layer.

4,927,993

LOCKING CYLINDER HEATING

Ray A. Simmons, P.O. Box 1193, Muskogee, Okla. 74402-1193

Filed Nov. 30, 1988, Ser. No. 277,977
Int. Cl.[5] E05B *17/00*; H05B *3/00*
U.S. Cl. 219—201 4 Claims



1. A device for preventing freezing or locking cylinders and adapted to be removably connected thereto, comprising:
an electrically and thermally conductive body member adapted to be electrically grounded, the body member comprising an upper box-like portion adapted to be received against the locking cylinder and a lower portion, the box-like portion including an internal recess with an top opening to permit passage of radiant and convected heat therefrom;
an incandescent bulb removably mounted within the internal recess with a first contact electrically isolated and a second contact electrically connected to the body member;
a temperature activated means mounted to the lower portion of the body member and electrically connected between a power source and the first contact of the bulb to illuminate the bulb at a predetermined temperature; and
a removable heat conductive spring thermally connectable at each end thereof to opposed upper ends of the body member and adapted to extend around the locking cylinder to hold the body member thereagainst and conduct heat to the locking cylinder.

4,927,994

MODULAR RESISTANCE HEATER ASSEMBLY

Kenneth B. Leger, Centerville, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

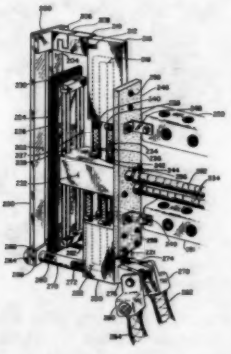
Filed Feb. 28, 1989, Ser. No. 318,030
Int. Cl.[5] H05B *3/08, 3/14*
U.S. Cl. 219—343 20 Claims

1. Modular electrical resistance heating apparatus comprising the combination of:
an elongated U-shaped uniplanar electrically conductive heater element having first and second parallel disposed, uniformly cross-sectioned U leg heating members which are joined together by an integral coplanar crossover portion located at one U leg member's end, said heater element including first and second cantilever support and

electrode attachment regions located at the crossover distal end of each said U leg heating member;

an expansion accommodating support member disposed at the crossover portion adjacent end of said heater element, said support member including means enabling thermally-induced movement of said heater element crossover portion along a first axis longitudinal of said U leg heating members together with captive retention of said crossover portion along the second and third axes orthogonal of said first axis;

first and second fixedly mounted, electrically segregated electrical header elements disposed adjacent said heater element support and electrode attachment regions;



first and second electrically conductive electrode elements disposed in threaded physical and electrical connection between respective ones of said electrical header elements and said heater element electrode attachment regions;

electrically conductive means connected respectively between each said first and second header elements and oppositely polarized terminals of a heater energizing controllable source of electrical energy;

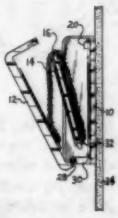
cooling means for controlling the operating temperature of said heater apparatus in the presence of thermal energy attending energized operation of said heater members.

4,927,995

ENCLOSED TOWEL WARMER

Robert R. Lovett, and Donna M. Lovett, both of 8407 Lindley #3, Northridge, Calif. 91325

Filed Feb. 24, 1989, Ser. No. 314,936
Int. Cl.[5] H05B 3/20
U.S. Cl. 219—385 **13 Claims**



1. A towel warming device comprising:

a main body having a substantially rectangular back panel adapted to mount vertically against a wall, a pair of vertical side panels integral with said back panel, and a horizontal bottom panel;

a cover having a substantially rectangular main portion and an integral perpendicular flange portion, said cover being adapted to cooperate with said main body to form a substantially orthogonal enclosure when said cover is disposed in a closed position relative to said main body such that said main portion of said cover is disposed vertically in engagement with said side panels so as to form a front panel of said enclosure, and said flange portion is disposed horizontally so as to form a top panel of said enclosure;

a flat rectangular towel holder member disposed between said side panels and pivotedly attached thereto in a lower region thereof, on a horizontal pivot axis, such that when said cover is disposed in said closed position, said towel holder is caused to become constrained in a substantially vertical position disposed such that a towel may be contained within said enclosure, supported upon said towel holder;

hinge means, disposed along a horizontal hinging axis, hingedly attaching said cover at a lower edge thereof to said bottom panel of said main body, whereby said cover is provided with freedom to move rotationally from said closed position outward from said wall to a tilted open position constrained by stopping means to a predetermined angle less than 45 degrees from vertical, tilting of said pivotally attached towel holder being constrained to about half said predetermined angle, thereby providing access to a towel supported upon said towel holder; and

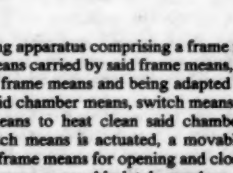
heating means adapted to warm a thusly supported towel.

4,927,996

COOKING APPARATUS, DOOR LATCHING CONSTRUCTION THEREFOR AND METHODS OF MAKING THE SAME

Francis S. Genbauffe, Irwin, and Steven A. Kimmel, Greensburg, both of Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Filed May 23, 1988, Ser. No. 197,288
Int. Cl.[5] F24C 7/08; H05B 1/02
U.S. Cl. 219—413 **26 Claims**



1. In a cooking apparatus comprising a frame means, a cooking chamber means carried by said frame means, heating means carried by said frame means and being adapted to be actuated to heat clean said chamber means, switch means for permitting said heating means to heat clean said chamber means only when said switch means is actuated, a movable door means carried by said frame means for opening and closing said cooking chamber means, a movable latch member carried by said frame means and being movable between a non-latching position thereof that permits said door means to be opened and closed and a latching position thereof that locks said door means in its closed position if said door means is in its closed position at the time said latch member is moved to said latching position thereof, and drive means carried by said frame means and having moving means operatively interconnected to said latch member to move said latch member between said positions thereof only when said moving means of said drive means moves from a first position thereof to a second position thereof,

the improvement wherein said latch member is movable from said non-latching position to a third position thereof by said drive means when said drive means tends to move said latch member from said non-latching position thereof to said latching position thereof when said door means is not in a closed condition thereof and said moving means of said drive means moves from said first position thereof to said second position thereof, said latch member being adapted to actuate said switch means only when said latch member is in said latching position thereof.

4,927,997

HEAT TRANSFER PAD

Samuel Bailey, Fairfield, Ohio, assignor to Beta Development Group, Inc., Lexington, Ky.

Filed Nov. 2, 1988, Ser. No. 266,137
Int. Cl.[3] H05B 3/72
U.S. Cl. 219—459 **10 Claims**

1. A heat transfer pad for optimizing heat transfer between an electric stove burner element and a cooking vessel, comprising:

a thermally conducting, relatively flexible disc for collecting and transferring heat, said flexible disc providing a heating surface for direct contact with a cooking vessel, said disc being provided with upper and lower surfaces, said upper and lower surfaces both being flexible; and

ring means for retaining said pad on a burner element, said ring means including thermal expansion accommodating means for said pad.

4,927,998

APPARATUS FOR COOKING BY ELECTRIC HEATING INCLUDING MEANS FOR PROVIDING INTERMITTENT TEMPERATURE CONTROL THEREOF

Haruhisa Tamura; Takahiko Yamasaki, both of Nara, and Mitsuhiro Hasegawa, Sakurai, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 146,646, Jan. 21, 1988, abandoned. This application Apr. 26, 1989, Ser. No. 342,679
Claims priority, application Japan, Jan. 22, 1987, 62-12897; Jan. 22, 1987, 62-12898
Int. Cl.[3] H05B 6/68
U.S. Cl. 219—494 **21 Claims**

1. A heating cooking apparatus for maintaining the temperature of a heating chamber included therein at a temperature which does not appreciably exceed a given temperature, said heating chamber being adapted to receive an object to be heated, comprising:

a heat source for heating said heating chamber and said object;

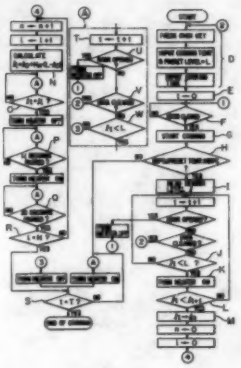
input means for setting the parameters of a heating operation to be performed on said object, said parameters being determined by the charcteristics of the object to be heated as represented by a coefficient K_n, said given temperature and the amount of time during which said object is to be heated;

a temperature sensor for detecting the temperature of said heating chamber and producing an output corresponding thereto; and

control means coupled to said input means, said temperature sensor and said heat source for controlling the temperature of said heating chamber in accordance with the parameters of said heating operation, said control means including

means for energizing said heat source to heat said heating chamber;

means for performing the calculation $l_n = l_0 + K_n(L - l_0)$, where l_0 corresponds to the output of said temperature sensor at the approximate start of heating of said heating chamber by said heat source, L is the output of said temperature sensor corresponding to said given temperature, and n is an integer;



means for stopping the heating of said heating chamber when the temperature sensed by said temperature sensor corresponds to the calculated value l_n; and

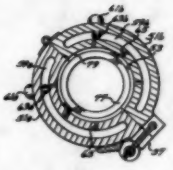
means for restarting the heating of said temperature chamber a predetermined interval after the heating of said heating chamber has stopped.

4,927,999

APPARATUS FOR FUSION JOINING PLASTIC PIPE

Reinhard Hanselka, Dunville, Calif., assignor to Georg Fischer AG, Switzerland

Division of Ser. No. 245,929, Sep. 14, 1988, Pat. No. 4,876,041, which is a continuation of Ser. No. 919,238, Oct. 14, 1986, abandoned. This application Jul. 21, 1989, Ser. No. 384,284
Int. Cl.[3] H05B 3/02; B29C 51/10
U.S. Cl. 219—535 **16 Claims**



1. An apparatus for fusion joining first and second axially abutted piping system component connection ends that are in axial and circumferential alignment, comprising:

enablement means for enabling the heating of a melt region in the proximity of the interface of the first and second piping system component connection ends at least to the material softening point of the thermo-plastic material of the melt region; and

vacuummetric means for vacuummetrically inducing outward translation of the melted material of the melt region.

4,928,000

METHOD AND APPARATUS FOR COMMUNICATION FOR A DATA-STORING TOKEN

David Eglise, 53 Alma Road, Windsor, Berkshire, SL4 3HH, and Alan J. Ruddell, 49 Barkham Ride, Wokingham, Berkshire, RG11 4HA, both of United Kingdom

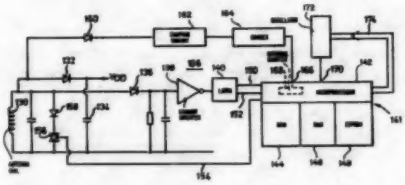
PCT No. PCT/GB87/00737, § 371 Date Aug. 19, 1988, § 102(e) Date Aug. 19, 1988, PCT Pub. No. WO88/02897, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 19, 1987, Ser. No. 211,858

Claims priority, application United Kingdom, Oct. 20, 1986, 8625074

Int. Cl.[5] G06F *15/20*

U.S. Cl. 235—380 11 Claims



1. A data-storing token which can perform a communication operation involving at least one of transmitting and receiving data in a contactless manner ussing an externally generated signal, said token comprising:

a clock generator for generating clock pulses, the clock generator including frequency adjustment means for adjusting the frequency of the clock pulses in response to a frequency adjustment signal; and

a processor arranged for receiving the clock pulses so as to operate at a rate dependent on the frequency of the clock pulses, said processor being arranged to execute a synchronization operation prior to the communication operation, the processor being responsive during the synchronization operation to the externally generated signal for producing the frequency adjustment signal, the frequency adjustment signal being such as to cause the clock frequency to approach a substantially predetermined relationship with the frequency of the externally generated signal, thereby to allow a subsequent synchronized communication operation to occur.

4,928,001

SECRET INFORMATION PRESERVING SYSTEM FOR A MULTIPLE ISSUER IC CARD

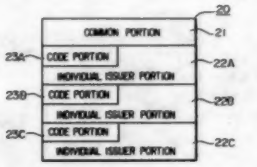
Shigeo Masada, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Toyko, Japan

Filed Mar. 17, 1988, Ser. No. 169,473

Claims priority, application Japan, Mar. 20, 1987, 62-66256

Int. Cl.[5] G06K *5/00*

U.S. Cl. 235—380 6 Claims



1. A system comprising a multiple issuer IC card and a terminal for reading information from and writing information to the multiple issuer IC card;

the multiple issuer IC card comprising memory blocks for assignment to respective issuers and means in each memory block for storing an issuer code of a particular one of a plurality of potential issuers; and

the terminal comprising means for reading the issuer codes from the IC card, means for inputting an input code and an identification code, means for comparing the issuer codes and the input code and means for writing, when a match is detected by said comparing means, said identification code into the memory block means storing the matched issuer code, thereby to activate the associated memory block with respect to that particular issuer.

4,928,002

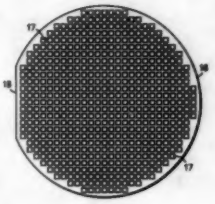
METHOD OF RECORDING TEST RESULTS OF DIE ON A WAFER

Dean Corley, Tempe, and Hugh Littlebury, Chandler, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Dec. 5, 1988, Ser. No. 278,882

Int. Cl.[5] G06K *13/04*

U.S. Cl. 235—479 7 Claims



1. A method of recording test results and location of die on a wafer, comprising: testing each die on the wafer; encoding the test results in a coded format on a piece of paper using a printer to record on the paper; transferring the wafer along with the piece of paper to a die pick and place machine; and scanning the piece of paper with an optical reader to determine which die to select.

4,928,003

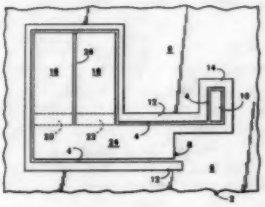
CHARGE-COUPLED DEVICE FOR DETECTING SPATIAL VARIATION IN THE INTENSITY OF ELECTROMAGNETIC RADIATION

Denis L. Heidtmann, Portland, and Morley M. Blouke, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 15, 1988, Ser. No. 219,954

Int. Cl.[5] H01L *27/14*

U.S. Cl. 250—211 J 24 Claims



1. A charge-coupled device for detecting spatial variation in the intensity of electromagnetic radiation in a given spectral region, comprising:

a body of semiconductor material that responds to electromagnetic radiation in said given spectral region by generating charge carriers, the body of semiconductor material

having first and second sense volumes that are isolated from each other with respect to diffusion of charge carriers, first and second transfer regions in communication with the first and second sense volumes respectively, and a readout region having first and second zones in communication with the first and second transfer regions respectively and being connected to an output node,

a sense electrode structure that overlies the sense volumes and comprises at least first, second and third electrode parts each extending over both the first and second sense volumes with the second electrode part between the first and third electrode parts, so that the second electrode part can establish a potential barrier in each of the sense volumes between the region that lies under the first electrode part and the region that lies under the third electrode part, and

a transfer electrode structure that overlies the transfer regions,

whereby charge can be accumulated in the sense volumes over an integration period and the resulting charge samples can be shifted separately through the transfer regions and applied to the output node.

4,928,004

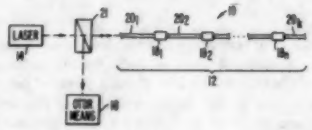
METHOD AND APPARATUS FOR SENSING STRAIN

Bernd D. Zimmermann, Hickory, N.C.; Richard O. Claus, Christiansburg, and Kent A. Murphy, Roanoke, both of Va., assignors to Center for Innovative Technology, Herndon, Va.

Filed Jun. 20, 1988, Ser. No. 210,890

Int. Cl.[5] H01J 5/16; G01D 5/34

U.S. Cl. 250—227.14 **22 Claims**



1. A strain sensor comprising:

(a) at least two optical waveguides separated by an air gap in a colinear relationship;

(b) a splice for fixing said waveguides in said relationship with said gap;

(c) means for generating optical pulses into the optical waveguides; and

(d) a structure in which localized strains are to be sensed;

(e) said optical waveguides and said splice being imbedded in said structure;

(f) means for sensing localized strain in said structure by determining shifts in arrival times of the optical pulses reflected at said splice by the sensing means that correspond to the localized strain.

4,928,005

MULTIPLE-POINT TEMPERATURE SENSOR USING OPTIC FIBERS

Hervé Lefèvre, Paris; Jean-Pierre Bettini, Perthes; Serge Botti, Viroflay, and Marc Turpin, Bure sur Yvette, all of France, assignors to Thomson-CSF, Paris, France

Filed Jan. 24, 1989, Ser. No. 300,926

Claims priority, application France, Jan. 25, 1988, 88 00780

Int. Cl.[5] H01J 5/16, 40/14

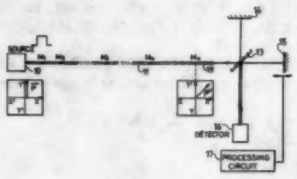
U.S. Cl. 250—227.23 **6 Claims**

1. A multiple-point temperature sensor using optic fibers, comprising:

a wide band optical source, of the pulse-modulated, plane polarized, super-luminescent diode type;

A birefringent, monomode, sensing optic fiber on which there have been created localized, weak coupling points, spaced out along the fiber, the input face of which is coupled to the source, the polarization axis of the source being aligned with a neutral axis of the fiber;

polarization means coupled to the output face of the fiber, to align the polarizations of the waves transmitted by the fiber (and make their interference possible);



a device for spectroscopic analysis, coupled to the output of the polarization means, to analyse the radiation transmitted and to form the transmission function of the sensor;

and processing means which, using the transmission function, extract the measurements of the temperatures of the segments of fibers between coupling points.

4,928,006

FLUID COUPLED FIBER OPTIC SENSOR

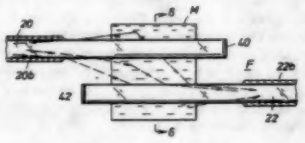
Charles H. Kershaw, 10454 Norton Dr., Houston, Tex. 77043

Division of Ser. No. 25,711, Mar. 13, 1987, Pat. No. 4,839,515.

This application Apr. 13, 1989, Ser. No. 337,965

Int. Cl.[5] H01J 5/16

U.S. Cl. 250—201.1 **10 Claims**



1. A method of using a transducer to determine a sensed condition, including the steps of:

transmitting a light signal through a first fiber optic conductor;

emitting at least a portion of the light signal from a side window means in a first fiber optic conductor to contact a light reflective surface means;

coupling optically the first and second fiber optic conductors with a preselected fluid medium;

capturing at least a portion of the emitted light signal from the first fiber optic conductor contacting said light reflective surface with a second fiber optic conductor;

transmitting the light signal captured by the second fiber optic conductor through the second fiber optic conductor;

sensing a value for the light signal conducted through the second fiber optic light conductor; and

determining the condition sensed by comparing the sensed value for the light signal conducted through the second fiber optic conductor with a reference value;

changing the relative position of an external the light reflective surface means in response to the sensed condition to proportionally control the captured portion of the emitted light signal.

4,928,007

OPTO-ELECTRIC A/D CONVERTER

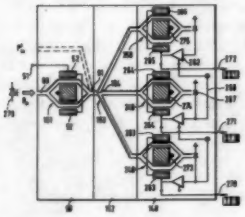
Norbert Fürstenau, Braunschweig, Fed. Rep. of Germany, and Christopher Watts, Madison, Wis., assignors to Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V., Cologne, Fed. Rep. of Germany

Filed Jun. 5, 1989, Ser. No. 361,378

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818865

Int. Cl.[5] H01J 5/16

U.S. Cl. 341—137 10 Claims



1. An opto-electronic A/D converter with a plurality of parallel connected optical waveguide interferometers acted upon by a single input light source, said interferometer having electrodes arranged parallel thereto the optical path lengths of said interferometers being defined by electrical fields between said electrodes, a respective photodiode being connected after each of said interferometers, said photodiodes transforming the output signal of said interferometers in each case into an electrical voltage, said electrical voltages being amplified and displayed, wherein a common input interferometer is connected in front of a common input of a plurality of parallel multistable interferometers, said input interferometer being acted upon by said input light source and having electrodes for application of an electrical input voltage, each of said parallel interferometers having a respective amplifier connected to receive the output voltage of a respective said photodiode, the amplified output voltages of said photodiodes being connected to said respective electrodes and the output voltage of a said respective photodiode of a higher value interferometer is in each case further connected up as the offset voltage to a said amplifier of the interferometer which has a lower value, and the output voltages of said individual amplifiers are tapped in each case as digital signals and from these a coded output signal of the A/D converter is formed, and means are provided for producing a periodically clocked resetting signal.

4,928,008

VARIABLE LIGHT TRANSMISSION FILTER AND OPTICAL ANALOG POSITION SENSOR

Raymond W. Huggins, Mercer Island, Wash.; Bruce Van Deventer, St. Louis, Mo., and Glen E. Miller, Redondo, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 11, 1987, Ser. No. 131,664

Int. Cl.[5] G01D 5/34

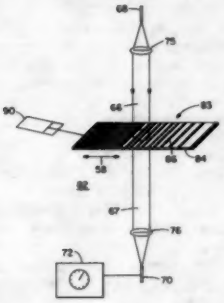
U.S. Cl. 250—231.1 26 Claims

1. A light transmission filter comprising:

a substrate having a selected configuration and having a first light transmission characteristic;

a pattern of spaced figures disposed on said substrate, said figures having a second light transmission characteristic;

said figures having selected dimensions, configurations and spacing relatively to at least one dimension of said substrate for providing an overall light transmission characteristic that varies in accordance with a selected mathematical function in a selected direction relative to at least one dimension of said substrate.



4,928,009

DEFLECTION-INSENSITIVE OPTICAL ROTARY ENCODER

Yo Ikebe, and Hideaki Oku, both of Yamanashi, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

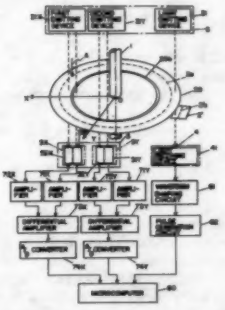
PCT No. PCT/JP88/00825, § 371 Date Apr. 13, 1989, § 102(e) Date Apr. 13, 1989, PCT Pub. No. WO89/01608, PCT Pub. Date Feb. 23, 1989

PCT Filed Aug. 19, 1988, Ser. No. 369,559

Claims priority, application Japan, Aug. 20, 1987, 62-205147

Int. Cl.[5] G01D 5/34

U.S. Cl. 250—231.13 9 Claims



1. A deflection-insensitive optical rotary encoder comprising a rotary disk (2) which is coupled to a rotary shaft (1), a light reception angle detecting part (4) which receives only a ray of light having penetrated an angle detection pattern (2a) which is formed on said rotary disk (2) among the light emitted from a light source (3), and an angle detection part (6) which detects a rotation angle of said rotary shaft (1) according to an output signal from said light reception angle detecting part (4), characterized in that the encoder further comprises:

a circular pattern (20b) which is formed as a concentric circle with a regard to the center of said rotary shaft (1) on said rotary disk (2) and which varies the intensity of penetrating light from said light source (3) depending on deflection of said rotary shaft (1),

a light reception part for detecting deflection (5) whose output signal is varied depending on variation of said intensity of penetrating light,

a deflection detection part (7) which detects the deflection of said rotary shaft (1) according to the variation of the output signal of said light reception part for detecting deflection (5), and

a calculation part (8) which corrects the rotation angle which is detected by said angle detection part (6) to a rotation angle around the axis of said rotary shaft (1) depending on the deflection detected by said deflection detecting part (7).

4,928,010

OBSERVING A SURFACE USING A CHARGED PARTICLE BEAM

Kenichi Saito, Ischara; Kou Wada, Kunitachi, and Masahiro Yoshizawa, Zama, all of Japan, assignors to Nippon Telegraph and Telephone Corp.

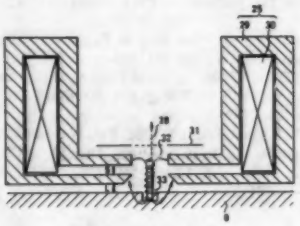
PCT No. PCT/JP87/00880, § 371 Date Jul. 25, 1988, § 102(e) Date Jul. 25, 1988, PCT Pub. No. WO88/04104, PCT Pub. Date Jun. 2, 1988

PCT Filed Nov. 13, 1987, Ser. No. 233,612

Claims priority, application Japan, Nov. 28, 1986, 61-283868; Oct. 21, 1987, 62-263968

Int. Cl.[5] H01J *37/26*

U.S. Cl. 250—310 **23 Claims**



1. An apparatus for observing a surface using a charged particle beam comprising:

a charged particle gun for emitting primary charged particles;

a charged particle beam irradiation trajectory control unit for irradiating a specimen with said charged particle beam and scanning the same;

a secondary electron detector for detecting secondary electrons emitted from said specimen in response to the irradiation of said specimen by said charged particle beam;

a focusing lens for controlling a position at which said primary charged particles are converged; and

an exciting device, provided between said specimen and said focusing lens, for producing a strong magnetic field over the surface of said specimen such that said secondary electrons are emitted in a spiral motion from recesses in the surface.

4,928,011

RADIATION IMAGE READ-OUT APPARATUS

Kazuo Shimura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 17, 1989, Ser. No. 325,322

Claims priority, application Japan, Mar. 18, 1988, 63-64926; Aug. 23, 1988, 63-209192

Int. Cl.[5] G03B *42/00*

U.S. Cl. 250—327.2 **10 Claims**

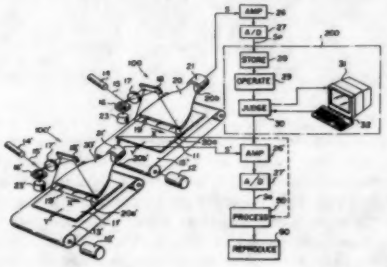
1. A radiation image read-out apparatus comprising:

(i) a preliminary read-out means for scanning a stimulable phosphor sheet, on which a radiation image has been stored, with a light beam in order to release part of the energy stored during exposure to radiation as light emitted from said stimulable phosphor sheet, detecting the light emitted by said stimulable phosphor sheet, and obtaining a preliminary read-out image signal which approximately represents said radiation image,

(ii) a final read-out means for scanning said stimulable phosphor sheet with a light beam having an energy intensity higher than that of said light beam used in said preliminary read-out means, detecting light emitted by said stimulable phosphor sheet when it is thus scanned, and obtaining a final read-out image signal which represents said radiation image,

(iii) an image processing means for receiving said final read-out image signal and carrying out image processing of said final read-out image signal, and

(iv) a condition adjusting means for receiving said preliminary read-out image signal, adjusting a read-out condition for use in obtaining said final read-out image signal and/or an image processing condition for use in carrying out image processing, said adjustment being effected on the basis of information carried by said preliminary read-out image signal, and feeding said read-out condition into said



final read-out means and/or feeding said image processing condition into said image processing means,

wherein said condition adjusting means is constituted of:

(a) a storage section for storing said preliminary read-out image signal,

(b) an operating section for reading said preliminary read-out image signal from said storage section, carrying out an operating process based on said preliminary read-out image signal in order to calculate a read-out condition to be used in obtaining a final read-out image signal and/or an image processing condition to be used in carrying out image processing of a final read-out image signal,

(c) a judging section for judging the reliability of said read-out condition and/or said image processing condition which were calculated by said operating section, and

d) a displaying section for indicating low reliability in cases where the judging section judges that reliability of said read-out condition and/or said image processing condition is low.

4,928,012

SYSTEM FOR MEASURING ELECTROMAGNETIC RADIATION ORIGINATING FROM THE HEMISPHERE

Dieter Lorenz, Hohenpeissenberg, Fed. Rep. of Germany, assignor to Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V., Cologne, Fed. Rep. of Germany

Continuation of Ser. No. 747,724, Jun. 21, 1985, abandoned. This application Oct. 19, 1989, Ser. No. 425,512

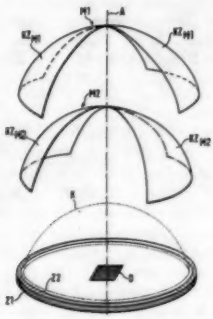
Claims priority, application Fed. Rep. of Germany, Jun. 26, 1984, 3423494

Int. Cl.[5] G01J *1/04*

U.S. Cl. 250—338.1 **14 Claims**

1. A system for measuring electromagnetic radiation originating from the hemisphere corresponding to a solid angle of 2π, comprising at least one low-inertia detector disposed below of a transmissive dome and two modulators in the shape

of dome segments having a common vertical axis which are fitted to each other and means for rotating both of said modulators about the common vertical axis at different relative speed



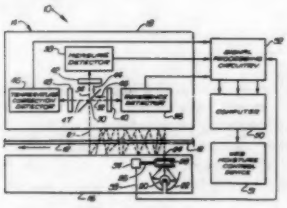
to each other so that the low-inertia detector is exposed to the average electromagnetic radiation from the entire hemisphere which is measured over time.

4,928,013

TEMPERATURE INSENSITIVE MOISTURE SENSOR

John Howarth, Monte Sereno, and Leonard M. Anderson, San Jose, both of Calif., assignors to Measurex Corporation, Cupertino, Calif.

Filed Feb. 17, 1987, Ser. No. 14,870
Int. Cl.[5] G01N *21/35*
U.S. Cl. 250—339 **4 Claims**



1. A paper web moisture sensor insensitive to web temperature, comprising:

an infrared radiation source for directing a beam of infrared radiation through a sheet of paper; and

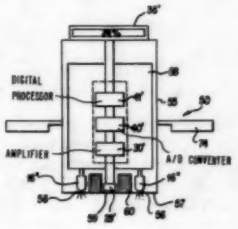
detecting means for detecting the amount of infrared radiation from the beam which transmits through the sheet in first and second separate wavelength regions of the infrared spectrum, wherein said first region is positioned around the infrared absorption peak for water so that the intensity of the infrared radiation transmitted through the sheet in the first region is substantially insensitive to the temperature of the sheet and the second region is selected to detect infrared radiation which is primarily sensitive to the amount of paper fiber in the path of the infrared beam.

4,928,014

NEAR-INFRARED APPARATUS AND METHOD FOR DETERMINING PERCENT FAT IN A BODY

Robert D. Rosenthal, Gaithersburg, Md., assignor to Futrex, Inc., Gaithersburg, Md.

Filed Oct. 3, 1988, Ser. No. 252,548
Int. Cl.[5] G01N *21/35*
U.S. Cl. 250—341 **20 Claims**



1. A method for determining percent fat in a body, comprising:

(a) providing a near-infrared quantitative instrument comprising

(i) at least one point source of near-infrared radiation;

(ii) a near-infrared radiation detector capable of providing an electrical signal upon detection of near-infrared radiation;

(iii) means for preventing near-infrared radiation from said at least one point source from impinging directly on said detector;

(iv) locating means for placing said at least one point source against a body to be tested so as to introduce near-infrared radiation into said body, wherein said locating means positions said detector for receiving near-infrared radiation from said at least one point source that interacts with said body and for providing an electrical signal corresponding to the fat content of said body; and

(v) means for converting the electrical signal corresponding to the fat content of the body into a readout indicative of the percent fat of the body;

(b) placing the at least one point source against a body to be tested with the detector or positioned for receiving near-infrared radiation that interacts with said body;

(c) transmitting near-infrared radiation into said body;

(d) detecting near-infrared radiation which interacted with said body; and

(e) providing a readout of percent body fat corresponding to an electrical signal indicative of near-infrared absorption provided by said detector.

4,928,015

MEASURING MULTICOMPONENT CONSTITUENCY OF GAS EMISSION FLOW

James W. Butler, Dearborn Heights; Thomas J. Korniski, Livonia, and Alex D. Colvin, Oak Park, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

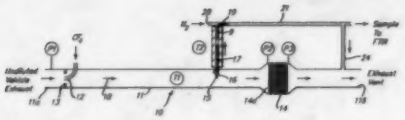
Continuation-in-part of Ser. No. 87,171, Aug. 19, 1987, Pat. No. 4,801,805. This application Oct. 3, 1988, Ser. No. 252,960
Int. Cl.[5] G01N *21/37*
U.S. Cl. 250—343 **15 Claims**

7. An on-line gas measurement apparatus, comprising:

(a) dilution tube means for sequestering a sample flow from a gas emission flow, said sample flow being diluted to lower its dew point to below room temperature and changed in either temperature and/or pressure to be substantially the same in temperature and pressure as that of gases used to create reference transmission frequency spectral data;

(b) FTIR apparatus effective to Produce electromagnetic signals with discernible amplitude variations resulting from irradiating said sample flow;

(c) computer means for (i) detecting and collecting said signals at a sufficiently high rate to substantially completely distinguish between adjacent spectral amplitudes



without mutual spectral interference, and (ii) analyzing said signals in accordance with Beer's Law to create reformed background-corrected data and applying reference transmission frequency spectral data to said reformed data for each suspected gas component to give a linear quantitative measure of the presence of each and every suspected gas component in said gas emission flow.

4,928,016

MAGAZINE FOR ACCOMMODATING RECORDING MEDIUM FOR ELECTRON MICROSCOPE

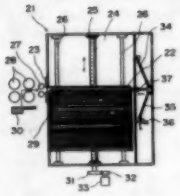
Nobufumi Mori; Katsuaki Muraishi; Terumi Matsuda; Masahiro Ohnishi, all of Kaisei; Hiromi Nunome, Akishima; Tadao Koyama, Akishima, and Tetsuo Oikawa, Akishima, all of Japan, assignors to Fuji Photo Film Co. Ltd., Kanagawa, Japan

Filed Dec. 8, 1988, Ser. No. 281,414

Claims priority, application Japan, Dec. 16, 1987, 62-317732

Int. Cl.[5] H01J *37/26*; G06K *13/00*; G03G *13/00*

U.S. Cl. 250—440.1 **10 Claims**



1. A magazine for both supplying recording media to and receiving recording media from an electron microscope comprising:

a vertically movable rack for said recording media composed of a plurality of shelves;

thrusting means provided at a predetermined height position for pushing out said recording media at said position to supply said recording media to said electron microscope;

means for reintroducing said recording media to said rack after exposure to be received in said rack; and

accommodating means for accommodating the recording media within the rack.

4,928,017

METHOD FOR RECORDING AND REPRODUCING RADIOGRAPHIC IMAGES

Sibylle Kemmler-Sack, Tübingen, Fed. Rep. of Germany; Romano Moriotti, Ferrania, Italy, and Jürgen Reichardt, Schwab Muenchen, Fed. Rep. of Germany, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 14, 1988, Ser. No. 284,298

Claims priority, application Italy, Dec. 22, 1987, 23154 A/87

Int. Cl.[5] C09K *11/79*

U.S. Cl. 250—483.1 **1 Claim**

1. A method of direct radiography for getting a radiograph from an X-ray image of an object, comprising the steps of:

(a) causing an X-ray radiation to pass through the object,

(b) collecting the passed radiation image onto a phosphor screen containing a phosphor capable of converting the radiation image into a light image,

(c) collecting the light image onto a photographic film capable of being impressed by the light image,

said method being further characterized in that said phosphor is a terbium and cerium activated ternary lutetium-gadolinium-yttrium orthosilicate phosphor according to the formula:

$$(Lu_xGd_yY_z)_2SiO_5: aTb, bCe$$

wherein $x+y+z=1$, $0.15 \leqq x \leqq 0.4.5$, $0.15 \leqq y \leqq 0.45$, $0.15 \leqq z \leqq 0.45$, $0.01 \leqq a \leqq 0.2$, $0.0008 \leqq b \leqq 0.0012$.

4,928,018

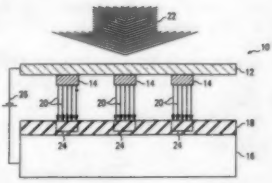
THERMO-ENHANCED ELECTRON IMAGE PROJECTOR

George R. Misium, Richardson, Tex., assignor to Texas Instruments, Incorporated, Dallas, Tex.

Filed Jun. 29, 1989, Ser. No. 373,360

Int. Cl.[5] H01J *37/317*

U.S. Cl. 250—492.2 **23 Claims**



1. An electron image projecting apparatus for emitting electrons from a mask to a substrate, which comprises:

an electron-emitting pattern formed adjacent the mask; and

a heat source applied to said pattern to provide a sufficient heat level for inducing the emission of electrons from said pattern to said substrate.

4,928,019

SYSTEM FOR COMPENSATIVELY CORRECTING FOR DISPLACEMENTS DUE TO HEAT IN MACHINE TOOLS

Kazuto Tomikawa, Mishima, and Hideo Fujie, Nagaizumi, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 9, 1987, Ser. No. 23,252

Claims priority, application Japan, Mar. 12, 1986, 61-53982

Int. Cl.[5] G01N *21/86*

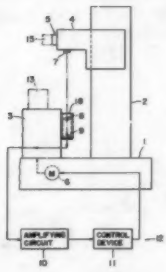
U.S. Cl. 250—561 **9 Claims**

1. A correction system for compensatively correcting for thermal displacement in a machine tool of the type having a column, a main spindle head ascendably and descendably supported on the column, a main spindle rotatably supported on the main spindle head and having means for holding a

machining tool, and a table for holding a workpiece to be machined by the tool, said correction system comprising:

at least one light source mounted on the main spindle head in the vicinity of the main spindle and operating to emit diffused light;

at least one lens mounted on the table in a state apart from and facing said at least one light source and functioning to receive said diffused light and to form an image of said at least one light source;



at least one light point displacement detector for detecting a variation of a position of the light source image of said at least one light source and generating a corresponding detection signal;

an amplifying circuit for amplifying said detection signal; and

a control means operating to determine, from the signal thus amplified, any relative displacement of the table and the light source and, on the basis of said relative displacement, to correct the relative position of the table and the main spindle.

4,928,020

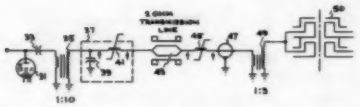
SATURABLE INDUCTOR AND TRANSFORMER STRUCTURES FOR MAGNETIC PULSE COMPRESSION

Daniel L. Birx, Londonderry, N.H., and Louis L. Reginato, Orinda, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 5, 1988, Ser. No. 178,041

Int. Cl.[5] H05H *5/08*

U.S. Cl. 307—106 **19 Claims**



1. Electrical transformation apparatus for a magnetic pulse compression circuit, the apparatus comprising:

two or more core assemblies substantially coaxially aligned around a common axis, each core assembly comprising:

a mandrel of mechanically rigid and conducting material with a ho[illegible] along the axis; and

an annular body of ferromagnetic or ferrimagnetic material surrounding and contiguous with the mandrel with side surfaces substantially perpendicular to the axis;

one or more insulating plates, with an insulating plate placed between the side surfaces of two core assemblies;

a first electrical conductor, having at least two ends and forming a plurality of parallel circuits with each circuit arranged to make one or more substantially complete turns around the core assemblies, with the first electrical conductor, comprising:

a first upper conducting plate substantially parallel to the side surfaces of the cores and electrically connected to a mandrel;

a first lower conducting plate substantially parallel to the side surfaces of the cores and electrically connected to a mandrel and wherein the first lower conducting plate and the first upper conducting plate are on opposite sides of the core assemblies; and

a first plurality of outer conducting rods distributed around and outside of the core and substantially parallel to the axis, electrically connected to the lower conducting plate;

signal input means, electrically connected to one end of the first electrical conductor, to introduce a voltage pulse or a current pulse into the electrical conductor at that end thereof; and

signal output means, electrically connected to a second end of the first electrical conductor, to receive a voltage pulse or a current pulse from the first electrical conductor.

4,928,021

ELEVATOR CONTROL APPARATUS

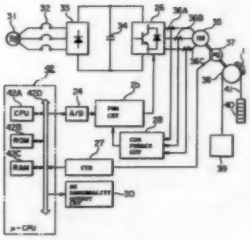
Masashi Yonemoto, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jan. 26, 1989, Ser. No. 301,716

Claims priority, application Japan, Jan. 28, 1988, 63-18069

Int. Cl.[5] B66B *5/02*

U.S. Cl. 187—108 **3 Claims**



1. An elevator control apparatus comprising torque control means for calculating a torque command for a motor for hoisting an elevator cage, a brake which operates in response to a braking command so as to restrain said motor, brake abnormality detection means adapted to operate when a difference between a maximum value and a minimum value of the torque command is less than a predetermined value, and a brake abnormality output circuit which delivers a predetermined signal in response to the operation of said brake abnormality detection means.

4,928,022

REDUNDANCY INTERCONNECTION CIRCUITRY

John R. Marum, Stanford, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Jul. 17, 1987, Ser. No. 74,608

Int. Cl.[5] H03K *17/693*

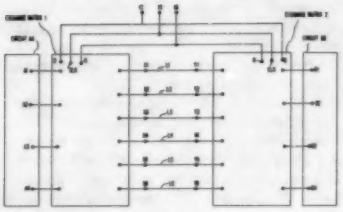
U.S. Cl. 307—241 **12 Claims**

1. Circuitry for coupling a first set of n terminals to a corresponding set of terminals selected from a larger set of m terminals, not all of which may be available, the circuitry comprising:

means for registering which of the m terminals are available; and

switching means, coupled to the means for registering, for connecting each of the n terminals to any available one of the m terminals, wherein the switching means automati-

cally connects a first of the n terminals to a first available one of the m terminals, selected in a predictable manner, and each next one of the n terminals to a next available one of the m terminals, also selected in a predictable manner,



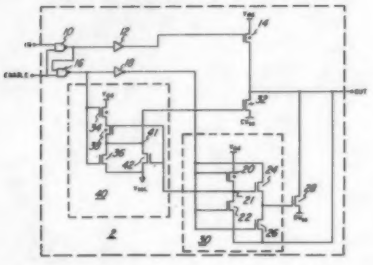
and wherein the switching means includes means for ensuring that each of the n terminals is connected to only a selected one of the m terminals, and means for ensuring that each of the m terminals is connected to no more than one of the n terminals.

4,928,023

IMPROVED OUTPUT BUFFER HAVING REDUCED NOISE CHARACTERISTICS

Steven P. Marshall, Missouri City, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 27, 1987, Ser. No. 90,076
Int. Cl.[5] H03K *17/16, 19/003, 5/12*
U.S. Cl. 307—443 **17 Claims**



1. An output buffer circuit for presenting an output signal at an output node responsive to an input signal at an input node, comprising:

pull-up means, connected between a power supply node and said output node;

a first pull-down transistor, having a source-to-drain path connected between said output node and a first reference node, and having a gate;

switching means, coupled to said input node, to said output node, and to said gate of said first pull-down transistor, for turning on said first pull-down transistor responsive to said input signal being at a first logic state, and for turning off said first pull-down transistor responsive to the voltage of said output node being substantially at the voltage of said first reference node, and having a drive control node;

a second pull-down transistor, having a source-to-drain path connected between said output node and a second reference node, and having a gate; and

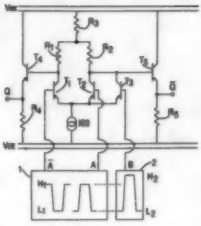
drive means, having a first input coupled to said input node, a second input coupled to said drive control node of said switching means, and an output coupled to said gate of said second pull-down transistor, for turning on said second pull-down transistor responsive to said first input with said input node being at said first logic state and said second input with the voltage of said output node being substantially at the voltage of said first reference node.

4,928,024

REFERENCELESS ECL LOGIC CIRCUIT

Isao Shimotsuhama, Kawasaki; Shinji Emori, Urawa; Yoshio Watanabe, Kawasaki, and Masaya Tamamura, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Apr. 28, 1989, Ser. No. 344,405
Claims priority, application Japan, May 13, 1988, 63-117627
Int. Cl.[5] H03K *19/013, 19/086*
U.S. Cl. 307—455 **28 Claims**



1. A logic circuit comprising:

a first NPN transistor and a second NPN transistor connected as a differential amplifier;

a third NPN transistor connected in parallel with said second transistor;

first driving means for driving said first and second NPN transistors with complementary signals having high and low levels; and

second driving means for driving said third NPN transistor with an output signal having a high level that is higher than the high levels of said complementary signals, and having a low level that is lower than the high levels of said complementary signals.

4,928,025

EMITTER COUPLED LOGIC CIRCUIT

Masayuki Kokado, Machida, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Jul. 1, 1988, Ser. No. 214,356
Claims priority, application Japan, Jul. 21, 1987, 62-181965
Int. Cl.[5] H03K *19/086, 19/003, 17/04, 19/013*
U.S. Cl. 307—455 **11 Claims**

1. An emitter coupled logic circuit, comprising:

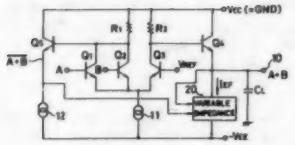
a plurality of transistors constituting current switches for receiving input signals and outputting mutually opposite first and second outputs, emitters of the plurality of transistors being mutually connected;

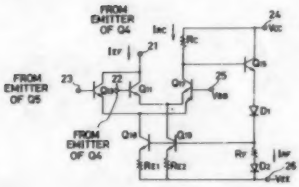
first emitter follower means for drawing the first output from said current switches, the first output being outputted through a first output terminal;

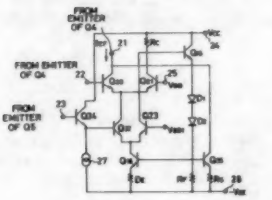
second emitter follower means for drawing the second output from said current switches, the second output being outputted through a second output terminal; and

variable impedance means being connected to both the first and second output terminals for providing a variable impedance to be coupled with said one output terminal, wherein said variable impedance means is for providing a first impedance when levels of the drawn first and second

outputs are both at a high-level, and a second impedance when at least one of the first and second outputs is at a







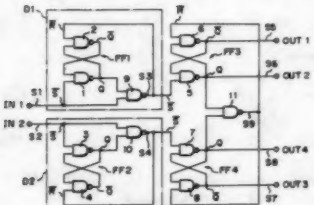
low-level, and wherein said first impedance is less than said second impedance.

4,928,026

DIGITAL PHASE COMPARING CIRCUIT

Hidetaka Ebesyu, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 22, 1988, Ser. No. 288,378
Claims priority, application Japan, Dec. 24, 1987, 62-325322
Int. Cl.[5] H03K *19/00, 5/00*
U.S. Cl. 307—479 **5 Claims**



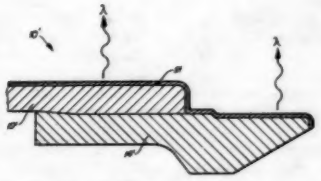
1. A digital phase comparing circuit, comprising:
first and second input terminals receiving first and second input signals, respectively;
a first rise detecting circuit for detecting a rise of said first input signal and outputting a first detection signal;
a second rise detecting circuit for detecting a rise of said second input signal and outputting a second detection signal;
a first flip-flop, operatively connected to said first rise detecting circuit, being set in response to said first detection signal and being reset in response to a reset signal;
a second flip-flop, operatively connected to said second rise detecting circuit, being set in response to said second detection signal and being reset in response to said reset signal; and
a logical state circuit responsive to an output of said first flip-flop and an output of said second flip-flop and, when the outputs of said first and second flip-flops coincide with each other, outputting said reset signal, wherein each output of said first and second flip-flops has a pulse width corresponding to a phase difference between said first and second input signals.

4,928,027

HIGH TEMPERATURE REFRACTORY MEMBER WITH RADIATION EMISSIVE OVERCOAT

William D. Deininger, Pasadena, and David Q. King, Sunland, both of Calif., assignors to The United States of America as represented by the administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 20, 1987, Ser. No. 87,376
Int. Cl.[4] H02K *44/10*
U.S. Cl. 310—11 **7 Claims**



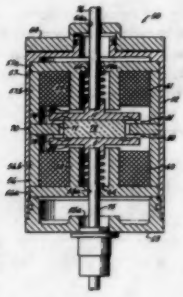
1. A heat radiator for radiating heat generated by high temperature plasma in a plasma accelerator/decelerator having an interior portion in contact with the plasma and an exterior portion not in contact with the plasma comprising:
a first layer made of a refractory material having a first spectral emissivity coefficient, the refractory material being disposed in the interior of the plasma accelerator/decelerator so as to contact the plasma and be heated by the plasma and wherein said refractory material is capable of withstanding temperatures of 1000° C. or higher without melting; and
a second radiative layer forming a portion of the exterior of the plasma accelerator/decelerator and mechanically and thermally coupled to the first layer to radiate heat from the first layer away from the interior of the plasma accelerator/decelerator, the second layer being made of a radiation emissive material including zirconium diboride and having a second spectral emissivity coefficient that is substantially greater than the first spectral emissivity coefficient for radiatively cooling the first layer and a coefficient of thermal expansion substantially equal to that of said refractory material.

4,928,028

PROPORTIONAL PERMANENT MAGNET FORCE ACTUATOR

Gregory Leibovich, Fullerton, Calif., assignor to Hydraulic Units, Inc., Duarte, Calif.

Filed Feb. 23, 1989, Ser. No. 314,753
Int. Cl.[5] H02K *33/12*; H01F *7/08*
U.S. Cl. 310—23 **42 Claims**



1. An actuator comprising:

stator means including first and second electromagnetic means, each of said electromagnetic means having main pole means in axial alignment in a first direction with the main pole means of the other and each having common pole means intermediate said main pole means and orthogonal to the direction of said main pole means;

armature means including permanent magnet means with first and second armature pole means having surfaces thereof disposed in spaced relation in said first direction to both said stator main pole means and said common pole means;

means for activating said electromagnet means for simultaneously providing a first attractive force between a first armature pole means and said common pole means, a first repulsive force between the first armature pole means and a first main pole means, a second attractive force between the second armature pole means and the second main pole means, and a second repulsive force between the second armature pole means and said common pole means, and

output means for enabling transfer of the relative displacement between said stator means and said armature means to a driven mechanism.

4,928,029

IN-SPINDLE MOTOR ASSEMBLY FOR DISK DRIVE AND METHOD FOR FABRICATING

Harold T. Wright, San Carlos, Calif., assignor to Maxtor Corporation, San Jose, Calif.

Division of Ser. No. 20,130, Feb. 27, 1984, Pat. No. 4,814,652. This application Sep. 22, 1988, Ser. No. 247,773
Int. Cl.[5] H02K *5/00*; G11B *5/012*
U.S. Cl. 310—89 **6 Claims**

1. A motor assembly for use in Winchester hard disk drives comprising:

a motor shaft;

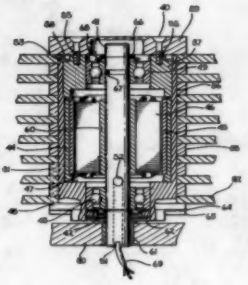
a stator affixed to said motor shaft, sad stator having electrical coil windings and being disposed about a longitudinal axis of said motor shaft;

a first hollow cylinder disposed about, and substantially aligned with, said motor shaft, said first hollow cylinder having a bore at a first end and inner and outer walls;

a second hollow cylinder disposed within said first hollow cylinder and being substantially aligned with said motor shaft, said second hollow cylinder having inner and outer walls;

a magnet means attached to said inner wall of said second hollow cylinder, said magnet means being disposed adjacent said stator;

said first hollow cylinder comprising a nonferromagnetic material and said second cylinder comprising a ferromagnetic material such that said second cylinder acts as a flux path for said magnet means;



an end cap means engageable with said second end of said first hollow cylinder, said end cap means having a bore disposed about said longitudinal axis of said stator shaft;

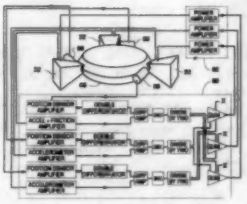
said first hollow cylinder and said end cap means having substantially the same coefficient of thermal expansion.

4,928,030

PIEZOELECTRIC ACTUATOR

Gordon W. Culp, Van Nuys, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 30, 1988, Ser. No. 252,197
Int. Cl.[5] H01L *41/08*
U.S. Cl. 310—328 **23 Claims**



1. A piezoelectric device configured to apply a force to an object, said device comprising:

(1) a crown having a friction surface which surface is proximate an object;

(2) a bottom having a surface supported by a support structure;

(3) at least one piezoelectric shear body integrally located intermediate said crown and said bottom;

(4) sensing means for determining the relative position of the crown in relation to the position of said supported surface;

(5) means for adjusting the proximate position, of the crown and the object;

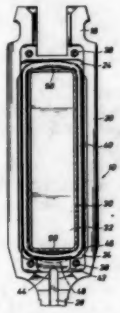
(6) means for detecting and measuring a physical contact force between the crown and said object; and

(7) means for effecting an electric potential within said piezoelectric device to activate same and apply velocity and acceleration forces to said object.

4,928,031
PRESSURE/TEMPERATURE COMPENSATED TRANSDUCER PAD ASSEMBLY

Eugene J. Linyaev, Houston, and Roy E. Swanson, Jr., Sugarland, both of Tex., assignors to Western Atlas International, Inc., Houston, Tex.

Filed Nov. 25, 1986, Ser. No. 934,672
Int. Cl.[5] H01L 41/08
U.S. Cl. 310—346 15 Claims



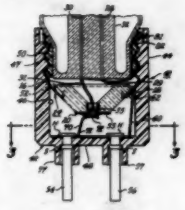
1. A transducer pad assembly, comprising:
a housing having a recess for receiving a transducer insert therein, said recess having a substantially flat bottom;
a transducer insert for disposition in said recess, said insert having a transmission surface of substantially the same shape as said bottom for mating placement and cooperation therewith;
a continuous strip of elastomeric material disposed between said housing and said insert about the periphery of said recess;
means for securing said insert in said recess in a fixed position relative to said housing for producing a closed cavity defined at least in part by said bottom of said recess, said transmission surface of said insert and said continuous strip of elastomeric material; and
an oil filling said cavity,
said continuous strip of elastomeric material being deformable to accommodate changes in the volume of said oil filling said cavity.

4,928,032
MEANS FOR CONVERTING A LAMP WITH A SCREW-TYPE BASE INTO A LAMP WITH A BI-PIN BASE

Michael J. Skoch, Mentor, and Frederick Hetzel, Brook Park, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 31, 1989, Ser. No. 331,554
Int. Cl.[5] H01J 5/50; H01R 33/02, 13/58, 17/00
U.S. Cl. 313—318 14 Claims

12. In combination,
(a) a high pressure sodium arc lamp comprising: (i) a glass envelope within which a sodium vapor arc is developed during lamp operation and (ii) a screw-type base joined to said envelope, said screw-type base comprising a conductive shell having external threads and a coniform outer end, a conductive eyelet at one end of the screw-type base disposed centrally of the coniform outer end of the shell, and electrical insulation between said coniform outer end and said eyelet,
(b) a cup-shaped adapter comprising: (i) a tubular body containing a bore that extends between opposite ends of said tubular body and (ii) an end wall extending across said bore at one end of said tubular body, said bore surrounding said shell and containing internal threads for threadedly receiving the external threads on said shell, said end wall and said tubular body being of electrical insulating material,
(c) two conductive pins extending through said end wall in laterally spaced-apart relationship and supported on said end wall,
(d) first conductive means within said adapter for electrically connecting the shell of said screw-type base to one of said pins when said shell is threaded into said internal threads, said first conductive means comprising conductive structure that is electrically connected to said one pin and has a free end that is engageable by said coniform outer end of said shell when said shell is threaded into said internal threads, thereby establishing electrical contact between said free end and said coniform outer end, and

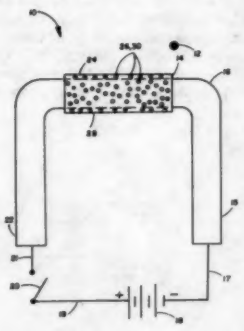


(e) second conductive means within said adapter and electrically insulated from first conductive means for electrically connecting the eyelet of said screw-type base to the other of said pins when the shell of said screw-type base is threaded into said internal threads.

4,928,033
THERMIONIC IONIZATION SOURCE

Glenn E. Spangler, Lutherville; John P. Carrico, Jr., Laurel, and Donald N. Campbell, Timonium, all of Md., assignors to Environmental Technologies Group, Inc., Baltimore, Md.

Filed Nov. 15, 1988, Ser. No. 272,231
Int. Cl.[5] H01J 1/02, 27/26, 37/08
U.S. Cl. 313—345 8 Claims



1. A thermionic emitter for providing positive ions comprising:
a mixture of beta alumina and inert material,
said beta alumina and inert material having portions thereof exposed on the surface of said mixture,
said exposed inert material portions providing surface sites characterized by a high work function for the emission of positive ions, and

means for heating said mixture to a predetermined temperature.

4,928,034

IMPREGNATED CATHODE

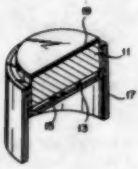
Sakae Kimura, Tokyo; Masaru Nikaido; Katumi Yanagibashi, both of Yokohama; Katsuhisa Homma, Kawasaki, and Yoshiaki Ouchi, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 58,362, Jun. 4, 1987, abandoned. This application Nov. 18, 1988, Ser. No. 273,157

Claims priority, application Japan, Jun. 6, 1986, 61-130223; Jun. 6, 1986, 61-130224

Int. Cl.[5] H01J 1/14

U.S. Cl. 313—346 R 3 Claims



1. An impregnated cathode, having stable electron emission characteristics at an early stage of operation and prolonged service life comprising:

(a) a porous pellet substrate consisting of a tungsten matrix impregnated with at least one alkaline earth oxide; and

(b) a continuous surface layer consisting of an alloy of iridium and tungsten having a thickness of 100 to 20,000 Å formed on an upper surface of said pellet substrate, wherein a crystal structure of said alloy has an ϵ_{II} phase, comprising an hexagonal close-packed structure, with lattice constants of $2.76 \leq a \leq 2.78$ and $4.44 \leq c \leq 4.46$,

wherein said stable electron emission characteristics are related to said lattice constants of said ϵ_{II} phase.

4,928,035

GLASS VIEWING SCREEN FOR A COLOR-PICTURE-REPRODUCING DEVICE AND A METHOD OF MAKING THE SAME

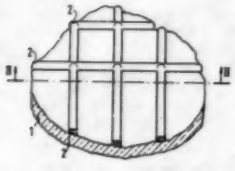
Michael Schlipf, Schorndorf, Fed. Rep. of Germany, assignor to Nokia Graetz, Pforzheim, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 922,738, Oct. 24, 1986, abandoned. This application Feb. 14, 1989, Ser. No. 311,089

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1985, 3538167

Int. Cl.[5] H01J 29/10

U.S. Cl. 313—466 7 Claims



1. A glass viewing screen for a color-picture-reproducing device, comprising:

a glass viewing screen;

phosphor areas deposited on the inside surface of said screen; and

a matrix of glass elements formed on said screen and surrounding said phosphor areas, said glass elements comprising a crystallizing sealing glass, applied to said screen as a paste by screen printing, said sealing glass paste having particles, 80 percent or more of which are smaller than 15 um, whereby the sealing glass has a characteristic such that it shrinks upon thermal crystallization.

4,928,036

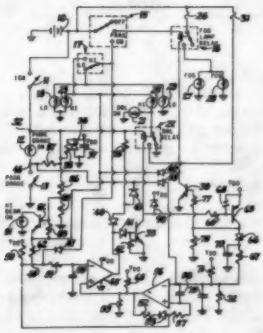
VEHICLE HEADLAMP SYSTEM WITH SERIES HIGH BEAM DAYLIGHT RUNNING LAMP OPERATION

Pierre Y. Abboud, Warren, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 123,711, Nov. 23, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,890

Int. Cl.[5] B60Q 1/02

U.S. Cl. 315—82 13 Claims



1. A headlamp system for a vehicle with an engine and an ignition switch effective to enable engine operation, the headlamp system comprising, in combination:

a source of electric power at a predetermined supply voltage;

a pair of headlamps on the front of the vehicle, one on each side thereof;

a headlamp switch having closed and open conditions;

a DRL enabling means;

first circuit means connecting one of the headlamps in series with the headlamp switch and electric power source;

a DRL activating switch effective in a first condition to connect the other of the headlamps in parallel with the one of the headlamps and in a second condition to connect the other of the headlamps in series with the one of the headlamps and the electric power source; and

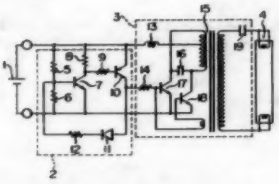
second circuit means responsive to the ignition switch, headlamp switch and DRL enabling means to put the DRL activating switch in its second condition when the ignition switch is activated, the DRL enabling means is enabled and the headlamp switch is in an open condition, whereby the headlamps are both energized at approximately half the predetermined supply voltage for improved visibility of the vehicle to other vehicle operators, and otherwise to put the DRL activating switch in its first condition, whereby the headlamps may both be energized with the full predetermined supply voltage for illumination of the road for vehicle operation with the headlamp switch in its closed condition.

4,928,037

PROTECTED DISCHARGE LAMP LIGHTING SYSTEM

Kenji Kawabata, Ome; Soichiro Ogawa, Tokyo, and Ryoichi Masaki, Ome, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 20, 1988, Ser. No. 286,702
Claims priority, application Japan, Dec. 25, 1987, 62-327149
Int. Cl.[5] H05B *37/02, 41/16*
U.S. Cl. 315—127 **1 Claim**



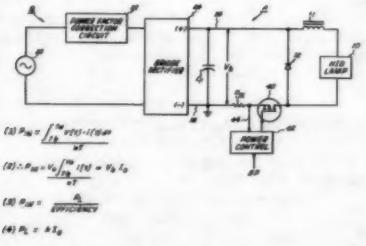
1. A discharge lamp lighting system comprising:
a d.c. power supply;
a lighting circuit to which an output from said d.c. power supply is supplied and from which a high frequency voltage is generated;
a discharge lamp connected at the output side of said lighting circuit; and
a lighting control circuit connected between said d.c. power supply and said lighting circuit, said lighting control circuit being constructed such that if a detected output voltage of said d.c. power supply is lower than a voltage value A at which a lamp discharge start voltage can be obtained, the operation of said lighting circuit is not allowed to start operating, when said detected output voltage reaches the voltage value A or over, said lighting circuit is caused to start operating and apply the start voltage to said discharge lamp to turn on said lamp, and after turning-on of said discharge lamp, when the output voltage of said d.c. power supply lowers smaller than a voltage value B at which said discharge lamp can still maintain its normal discharge said lighting circuit operation is stopped.

4,928,038

POWER CONTROL CIRCUIT FOR DISCHARGE LAMP AND METHOD OF OPERATING SAME

Louis R. Nerone, Brecksville, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 26, 1988, Ser. No. 248,882
Int. Cl.[5] H05B *39/04*
U.S. Cl. 315—209 R **38 Claims**



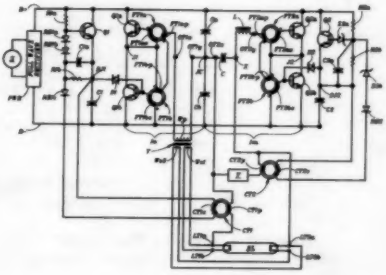
1. A power control circuit for controlling the power to a discharge lamp from a power supply including a d-c input stage and a power switch selectively switched between a conductive state to pass current through said lamp and a non-conductive state, whereby current passing through said lamp increases when said switch is in said conductive state and decreases when said switch is in said non-conductive state, said power control circuit comprising:
current control means for creating a series of operating cycles (T) including a first driving portion (W) wherein said switch is rendered alternately conductive and non-conductive in succession and a quiescent portion (T-W) wherein said switch is non-conductive;
means for sensing the instantaneous current through said power switch and independent of said current passing through said lamp;
means for creating a first signal proportional to average of said sensed current;
means for creating a second signal proportional to a set point power;
means for creating an error signal indicative of the difference between said first and second signals; and
means for adjusting the time of said first driving portion (W) of said operating cycle (T) in accordance with said error signal whereby the output power of said power supply is continuously adjusted toward said set point power.

4,928,039

ELECTRONIC BALLAST WITH LAMP PRE-CONDITIONING

Ole K. Nilssen, Caesar Dr. Rte. 5, Barrington, Ill. 60010

Continuation of Ser. No. 678,021, Dec. 4, 1984, abandoned. This application Jul. 10, 1989, Ser. No. 377,767
Int. Cl.[5] H05B *37/02*
U.S. Cl. 315—209 R **22 Claims**



14. An arrangement to power a fluorescent lamp, comprising:
source adapted in response to trigger pulses to provide, for each trigger pulse, power to the lamp for a brief period; and
means operative controllably and periodically to provide said trigger pulses, thereby controllably to provide periodic brief periods of lamp operating power.

4,928,040

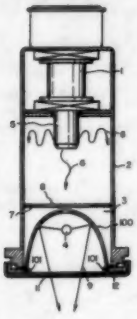
ULTRA VIOLET RAY GENERATOR BY MEANS OF MICROWAVE EXCITATION

Osamu Uesaki, 11-8, Kasukabe Higashi 5-chome, Kasukabe-shi, Saitama Prefecture, Japan

Filed Aug. 4, 1988, Ser. No. 228,043
Claims priority, application Japan, Aug. 7, 1987, 62-121264[U]
Int. Cl.[5] H05B *41/24*
U.S. Cl. 315—248 **4 Claims**

1. An ultra violet ray generator using excitation of a UV lamp by microwaves comprising a microwave generator for generating microwaves, a microwave cavity connected with said microwave generator, and an ultra violet ray lamp disposed in said microwave cavity, said microwaves generated from said microwave generator being introduced into said

microwave cavity through a slot in an upper wall of said microwave cavity, and said ultra violet ray lamp in said microwave cavity being irradiated and exited with said microwaves to generate ultra violet rays, wherein an ultra violet ray reflector is detachably secured near said ultra violet ray lamp in said microwave cavity, said reflector consisting of a light-transmitting base and an interference film thereon, and interference film having a thickness of 2 to 2.2 microns, said interference film being formed by vacuum-evaporating a first layer of zirconium oxide on the base and subsequently a second layer of silicon oxide on the first layer, and repeating said vacuum evaporations.



4,928,041

FLAT DISPLAY DEVICE

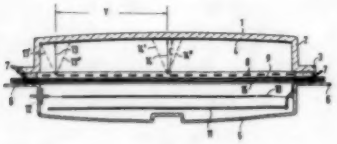
Uwe Mayer, Kirchheim-Teck, and Kurt-Manfred Tischer, Wendlingen, both of Fed. Rep. of Germany, assignors to Nokia Graetz, Pforzheim, Fed. Rep. of Germany

Filed Feb. 6, 1989, Ser. No. 306,985

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805858

Int. Cl.[5] H01J *29/70, 29/56*

U.S. Cl. 315—366 **9 Claims**



1. A process for operating a flat display device of the type that displays information by generating a plurality of lines, said display device having a phosphor-coated glass faceplate and a trough-shaped back metal envelope defining an evacuated interior space, within which there is arranged an area cathode with an extract anode in front of it and, between the latter and the faceplae, a control structure and a deflection device to which there are applied deflection voltages used to deflect a plurality of electron beams used to generate each line, characterized in that the deflection voltages are modulated in such a way as to be inversely proportional to the particular distances between the deflection devices (8) and the phosphor coating (4).

4,928,042

CIRCUIT ARRANGEMENT FOR OPERATING A MULTI-PHASE SYNCHRONOUS MOTOR ON A DIRECT-VOLTAGE SYSTEM

Klaus Harms, Vaihingen/Enz; Hans-Dieter Schray, Markgröningen; Bernd Taubitz, Schwieberdingen, and Rainer Wirtz, Markgröningen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

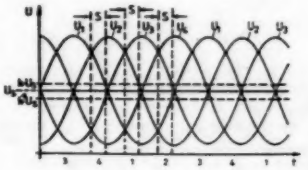
PCT No. PCT/DE87/00109, § 371 Date Aug. 31, 1988, § 102(e) Date Aug. 31, 1988, PCT Pub. No. WO87/05756, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 12, 1986, Ser. No. 272,881

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1986, 3609826

Int. Cl.[5] H02K *29/00*

U.S. Cl. 318—254 **18 Claims**



1. Circuit arrangement for operating a multi-phase synchronous motor on a direct current voltage mains, comprising a number of current valves which corresponds to the number of phases of the armature winding of the synchronous motor, each of said current valves being connected in series with an assigned phase of the armature winding to the direct current voltage source; a ring counter, having a counting input and a plurality of parallel counting outputs, each counting output being connected to a control input of an assigned control valve and when the count at the respective counting outputs in the ring counter cyclically assumes high value, the corresponding current valve is switched over into conduction; a ring counter switching device including a comparison device for comparing voltage drops across two blocked current valves, the first voltage drop being in opposite electrical phase relative to the alternating voltage induced in the phase of the armature winding which is connected to the currently conducting current valve, and the second voltage drop being in opposite electrical phase relative to the alternating voltage induced in the phase of the armature winding which is connected to the subsequent current valve when viewed in the direction of rotation of the motor; said comparison device generating a counting pulse when said second voltage drop exceeds said first voltage drop; means for deriving a set voltage value ($k \cdot U_S$) from the direct voltage of said source; and said ring counter switching device further including means for delivering said counting pulse to said counting input of the ring counter for as long as said first voltage drop exceeds said set voltage value ($k \cdot U_S$).

4,928,043

BACK EMF SAMPLING CIRCUIT FOR PHASE LOCKED LOOP MOTOR CONTROL

Allan B. Plunkett, Portland, Oreg., assignor to Synektron Corporation, Portland, Oreg.

Filed Nov. 14, 1988, Ser. No. 270,611

Int. Cl.[5] H02R *6/02*

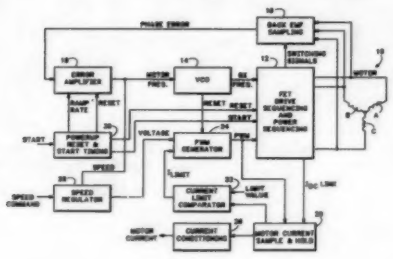
U.S. Cl. 318—254 **11 Claims**

1. A brushless electrical rotary machine having a rotor and a stator and including a plurality of windings driven by a multiphase inverter for selectively energizing said windings in sequence, comprising:

(a) a phase detector having sampling means, including switching means responsive to said multiphase inverter, for sampling the back emf across at least one of said wind-

ings only during a period of time when said winding is normally not energized, said sampling means producing a phase error signal;

(b) integrator means responsive to said phase error signal for producing a drive signal; and



(c) oscillator means responsive to said drive signal for controlling the frequency at which said multiphase inverter selectively energizes said windings.

4,928,044

SPINDLE MOTOR STOP CONTROL DEVICE

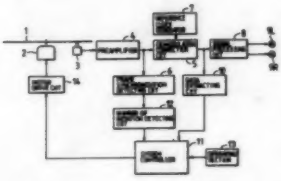
Takahumi Shiba, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 285,973

Claims priority, application Japan, Dec. 19, 1987, 62-322507

Int. Cl.[5] H02K *5/00*

U.S. Cl. 318—364 **4 Claims**



1. A spindle motor stop control device for applying a reverse torque braking force to a spindle motor for rotating a data record disc comprising:

number of rotation detecting means for detecting and outputting a detection signal when the number of rotation of said spindle motor has decreased to a fraction (1/n) of a predetermined value in response to the reverse torque braking force;

measuring means for measuring the time interval, T between the time instant that said reverse torque braking force is applied to said spindle motor and the time that said detection signal is outputted;

arithmetic means for calculating a period of time t which is a function of said time interval T, and

means for continuing the application of said reverse torque braking force for the period of time t from the time of production of said detection signal.

4,928,045

CIRCUIT ARRANGEMENT FOR GENERATING A MEASUREMENT SIGNAL ASSOCIATED WITH THE FREQUENCY OF AN ALTERNATING CURRENT SIGNAL

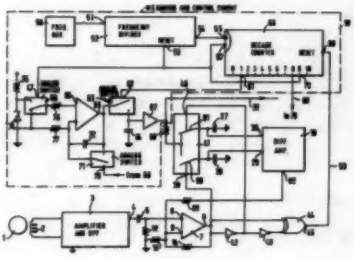
Benno Doemen, St. Georgen, Fed. Rep. of Germany, assignor to Papst-Motoren GmbH & Co. KG, St. Georgen, Fed. Rep. of Germany

Continuation of Ser. No. 85,566, Jul. 6, 1987, Pat. No. 4,823,060. This application Apr. 7, 1989, Ser. No. 334,539

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1985, 3539556

Int. Cl.[5] G01R *23/09*

U.S. Cl. 318—464 **11 Claims**



1. A circuit arrangement for generating measurement signals associated with the frequency of an alternating current signal, for measuring and regulating the synchronization of an electric motor, comprising:

a measuring and control circuit; and

a comparator circuit which converts the two opposite polarity halfwaves of the alternating current signal into pulses whose edges trigger the measuring and control circuit to generate the measurement signals in the form of digital signals or direct voltage signals, wherein the measurement signals correspond to the half-period durations of each of the two opposite polarity halfwaves of the alternating current signal measured from the respective zero passages; the measurement signals of each of the two opposite polarity halfwaves are averaged and stored separately and continuously over a plurality of periods in accordance with the positive and the negative halfwaves of the alternating current signal, and the difference of the stored values between the two opposite polarity halfwaves is fed as a correction signal to a comparison voltage input of the comparator circuit.

4,928,046

MULTIPLE ROTATIONAL POSITION SENSOR

Yutaka Karasawa, Iida, Japan, assignor to Tamagawa Seiki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 20, 1989, Ser. No. 340,856

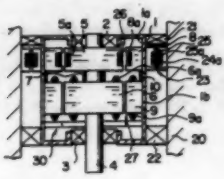
Claims priority, application Japan, Dec. 29, 1988, 63-330926

Int. Cl.[5] H02K *39/00*

U.S. Cl. 318—654 **3 Claims**

1. A multiple rotational position sensor comprising a stator winding provided to a stator mounted to a casing, and a rotor having a rotor winding provided to a rotor shaft mounted for rotation to said casing, in which the rotational position is sensed by the relative rotation between the rotor and the stator, wherein the improvement resides in that the multiple rotational position sensor comprises further a speed reducing unit adapted for coupling the rotor shaft and the casing to-

gether, and outer bearings for rotatably carrying said casing, said casing being revolved by rotation of said rotor shaft and



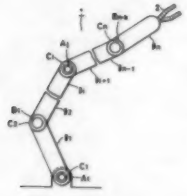
said casing being revolved by an angle less than the angle of rotation of said rotor shaft.

4,928,047

MANIPULATOR AND CONTROL METHOD

Hirohiko Arai, and Susumu Tachi, both of Tsukuba, Japan, assignors to Agency of Industrial Science & Technology, Ministry of International Trade, Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 325,926
Claims priority, application Japan, Mar. 31, 1988, 63-80079
Int. Cl.[5] B25J 1/02
U.S. Cl. 318—568.16 **2 Claims**



1. A multiple-degree-of-freedom manipulator comprising:

a plurality of links;

at least one passive joint for joining adjacent links and which is provided with a first sensor for detecting relative angles or relative displacements of said links and a brake which is brought to an operating state wherein said passive joint is completely fixed immovably and a release state wherein said passive joint is freely movable;

at least one active joint for adjacent links and provided with an actuator for actuating said active joint and a second sensor for detecting relative angles or relative displacements of said links; and

control means for driving said actuator and switching said brake between said operating state and said release state on the basis of relative angles or relative displacements of said links detected by said first and second sensors.

4,928,048

FAST RESPONSE CONTROL CIRCUIT

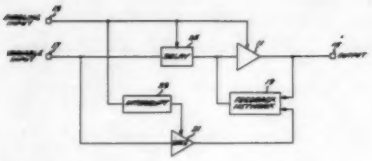
James H. Doyle, Orange, Calif., assignor to Unit Instruments, Inc., Orange, Calif.

Filed Mar. 28, 1988, Ser. No. 174,515
Int. Cl.[5] G05B 7/00
U.S. Cl. 318—644 **18 Claims**

1. A fast response control circuit comprising:

amplifier means, responsive to an enabling input signal to provide an output signal having a magnitude determined by a variable input signal;

a feedback network in feedback relationship with the amplifier means and defining therewith a control loop comprising a capacitor and resistor in series characterized by a response time; and



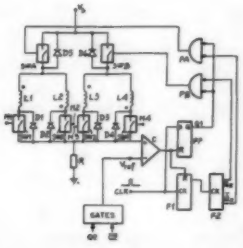
bias means connected intermediate said capacitor and said resistor, operative to apply a bias signal to the control loop and thereby to reduce the response time.

4,928,049

CIRCUIT FOR CONTROLLING CURRENT SWITCHING IN MULTIPLE INDUCTIVE LOADS, WITH SINGLE CURRENT DETECTOR, PARTICULARLY FOR WINDINGS OF STEP MOTORS

Giovanni Pietrobon, Treviso; Domenico Rossi, Cilavegna, and Salvatore Pappalardo, Padova, all of Italy, assignors to SGS-Thomson Microelectronics SRL, Italy

Filed Sep. 16, 1988, Ser. No. 245,657
Claims priority, application Italy, Oct. 5, 1987, 22141 A/87
Int. Cl.[5] H02P 8/00
U.S. Cl. 318—685 **3 Claims**



1. A circuit for controlling current switching in multiple inductive loads fed by means of respective switching switches and by means of respective current adjustment switches comprising a single sensor resistor connected in series to said switching switches, and a single comparator circuit adapted to generate a logical signal when the voltage across the sensor resistor exceeds a reference voltage (V_{ref}), said single comparator circuit driving through said logical signal respective first inputs of a plurality of AND gates, said plurality of AND gates controlling said current adjustment switches, and respective second inputs of said plurality of AND gates being driven by respective square-wave signals from a circuit means in opposite phase with a period equal to twice the switching period of a clock signal inputted to said circuit means.

4,928,050
RECORDER

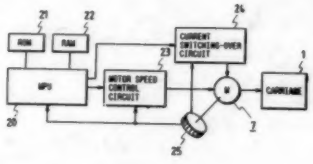
Akira Torisawa, Machida; Masaaki Kakizaki, Kawasaki; Noriaki Ito, and Shigeru Yoshimura, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 27, 1989, Ser. No. 302,196

Claims priority, application Japan, Jan. 29, 1988, 63-16855; Mar. 20, 1988, 63-122034

Int. Cl.[5] H02P 8/00

U.S. Cl. 318—696 9 Claims



1. A recording apparatus in which a recording head is moved to effect scan for recording, comprising:

a carriage carrying the recording head;

a stepping motor for moving the carriage;

detection means for detecting a rotation angle position of a rotor of the stepping motor, the detection means generating a pulse signal for every predetermined angle of rotation of said rotor;

control means for counting the pulse signals from said detection means, detecting a position of said carriage in accordance with a counted value and outputting start and stop control signals of said carriage in accordance with counted values; and

current switching means for controlling switch-over of excitation current supplied to a coil of the stepping motor in accordance with pulse signals from said detection means, the current switching means starting switch-over control of the excitation current by the start control signal from said control means and stopping the switch-over control of the excitation current by the stop control signal.

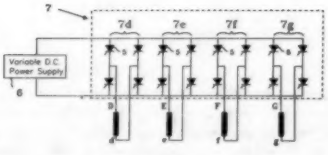
4,928,051
ELECTRIC MOTOR

Jozsef Demeter, 2a Avenida Los Palos Grandes, Ed. Jacaranda, Apto. 3-A, Caracas, Venezuela; Tibor Zoltai, 476 Summit Ave., Saint Paul, Minn. 55102, and Hector D. Navarro, Apdo. 47411, Caracas 1041-A, Venezuela

Continuation of Ser. No. 46,849, May 5, 1987, abandoned. This application Jan. 13, 1989, Ser. No. 298,762

Int. Cl.[5] H02P 5/40

U.S. Cl. 318—731 5 Claims



1. A method of operating an electric motor having a rotor and a stator, comprising the steps of supplying said rotor with a first current from a first current source having means defining a first maximum number of phases, said rotor being provided with said first maximum number of phase windings, and said first phase windings constituting the sole phase windings on said rotor and each being connectible to and disconnectible from a respective phase of said first source; and supplying said stator with a second current from a second current source having means defining a second maximum number of phases, said second maximum number being different from said first maximum number, and said stator being provided with said second maximum number of second phase windings, said second phase windings constituting the sole phase windings on said stator and each being connectible to and disconnectible from a respective phase of said second source, the supplying steps being performed so that said first source has a first number of excited phases and said second source has a second number of excited, phases different from the first number of excited phases, and the supplying steps inducing rotation of said rotor, the supplying steps including connecting all of said first phase windings to said first source so as to produce a first magnetic field and simultaneously connecting all but one of said second phase windings to said second source so as to produce a second magnetic field which, if out of alignment with said first magnetic field, becomes aligned therewith due to rotation of said rotor, the supplying steps further including disconnecting one of said first phase windings from said first source so that said first magnetic field rotates through a first angle and simultaneously connecting said one second phase winding to said second source so that said second magnetic field rotates through a second angle which differs from said first angle due to the difference between said first maximum number and said second maximum number, said one first phase winding and the polarity of the current in said one second phase winding being selected in such a manner as to cause said magnetic fields to rotate in the same sense and to minimize the angles of rotation of said magnetic fields.

4,928,052
POWER SUPPLY REGENERATING CIRCUIT

Yoshiki Fujioka, Yamanashi, and Mitsuhiko Hirota, Tokyo, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

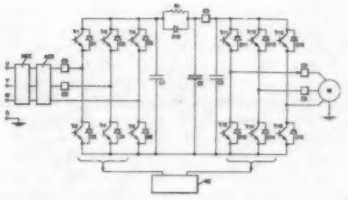
PCT No. PCT/JP88/00417, § 371 Date Nov. 9, 1988, § 102(e) Date Nov. 9, 1988, PCT Pub. No. WO88/08639, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 27, 1988, Ser. No. 274,148

Claims priority, application Japan, Apr. 30, 1987, 62-107255; Apr. 30, 1987, 62-107258; Apr. 30, 1987, 62-107259

Int. Cl.[5] H02P 3/18

U.S. Cl. 318—762 5 Claims



1. A power supply regenerating circuit for driving an induction motor upon controlling AC frequency and voltage by an inverter after three-phase power is rectified and smoothed by a rectifying circuit, and for rectifying and smoothing induced electromotive force during deceleration of the induction motor and effecting a conversion into AC power by a semiconductor bridge circuit for performing power supply regeneration, said power supply regenerating circuit comprising:

a parallel circuit including a reverse connected diode and a resistor connected between the rectifying circuit and the bridge circuit, the regenerative power blocked by said diode being supplied to the bridge circuit as a current limited by said resistor, and the regenerative power being supplied only during a predetermined interval of a three-phase period; and

a power supply frequency discriminating circuit including:

synchronizing signal generating means for generating signals upon successively detecting points at which an instantaneous value of voltage in one phase of a three-phase supply and an instantaneous value of voltage in a next phase of the three-phase power supply become equal;

clock generating means for generating clock pulses;

counting means, coupled to said synchronizing signal generating means, for counting clock pulses between signals from said synchronizing signal generating means;

discriminating means, coupled to said counting means, for discriminating one of 50 Hz and 60 Hz in dependence upon a counted value in said counting means; and

control means, coupled to said discriminating means and the bridge circuit, for controlling the bridge circuit by a signal from said discriminating means.

4,928,053

CONTROL CIRCUIT FOR AN INDUCTIVE LOAD

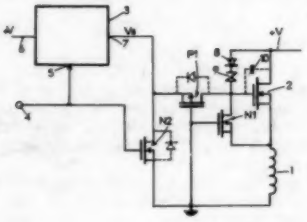
Thierry M. A. Sicard, Fenouillet, and Michel J. Suquet, Villeneuve-Tolosane, both of France, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 4, 1989, Ser. No. 333,367

Claims priority, application France, Apr. 14, 1988, 88 04938

Int. Cl.[5] G05F *1/56*

U.S. Cl. 323—284 **9 Claims**



1. A control circuit for an inductive load, comprising an N-channel MOS power transistor, the drain of which is connected to the positive terminal of a direct current electrical supply source supplying a voltage +Vbat while the inductive load is connected between the source of this transistor and ground, the drain-source circuit of an N-channel MOS interconnecting transistor (N1) being connected between the gate and the source of the power transistor, said interconnecting transistor having a conduction threshold below that of the power transistor, said control circuit comprising a P-channel MOS isolating transistor (P1), the drain and the gate of which are connected respectively to the gate of the power transistor and to the ground of the circuit, the source of the isolating transistor (P1) being selectively brought to a voltage less than or greater than +Vbat, to block or to unblock the conduction of the power transistor, respectively.

4,928,054

SWITCH MODE ELECTRICAL POWER CONTROLLER

Fernando Martin-Lopez, Santa Clara County, Calif., assignor to Seagate Technology, Inc., Scotts Valley, Calif.

Continuation-in-part of Ser. No. 179,165, Apr. 8, 1988, abandoned. This application Sep. 20, 1988, Ser. No. 246,764

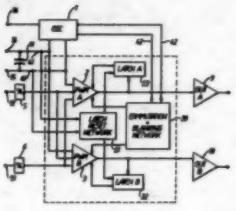
Int. Cl.[5] G05F *1/56*

U.S. Cl. 323—288 **7 Claims**

1. A switch mode power supply controller of the type that provides a repetitive output signal having a first state and a second state wherein the ratio of the first state of the output signal to the second state of the output signal varies in response to an error voltage signal representative of the difference between the actual output voltage of a power supply to which said controller belongs and a desired output voltage, said switch mode power supply controller comprising:

means for generating an oscillator signal and a control signal derived from said oscillator signal, wherein said oscillator signal has a ramp portion and a second portion, said control signal having a first state corresponding to the ramp portion of said oscillator signal and a second state corresponding to said second portion of said oscillator signal,

a pulse width modulating network comprising a comparator having a first and second input ports, wherein said first



input port is connected to said oscillator signal and said second input port is connected to said error voltage signal, the output signal of said switch mode power supply changing states when the magnitude of the ramp portion of the oscillator signal is less than the magnitude of the error voltage signal,

feedback means for latching said comparator at substantially the same time as a change in the output signal,

means for blanking the comparator such that the output signal does not change states during the second portion of the oscillator signal.

4,928,055

CONTROL CIRCUIT FOR HEAT FIXING DEVICE FOR USE IN AN IMAGE FORMING APPARATUS

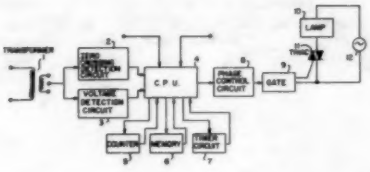
Shozo Kaieda, Hachiojt; Ikuo Kurashima, Tama; Hideo Okazima, Tama, and Jun Mai, Tama, all of Japan, assignors to Kentek Information Systems, Inc., Allendale, N.J.

Filed Feb. 28, 1989, Ser. No. 316,512

Claims priority, application Japan, Nov. 25, 1988, 63-296247

Int. Cl.[5] G05F *5/00*

U.S. Cl. 323—300 **7 Claims**



1. A control circuit for a heat fixing device for use in an image forming apparatus comprising means for detecting a power source voltage, means for detecting zerocrossing points of the power source voltage, means for determining a frequency of the source voltage from the detected zero-crossing points, means for determining a power supplying time interval based on the detected power source voltage and the determined power source frequency, means for controlling the power supplied to a load in accordance with the determined power supplying time interval, whereby a given power is automatically applied to the load when the power source voltage or frequency changes, wherein a time from zerocrossing to power supply starting is stored in a memory as data for different values of power source voltage and frequency and the

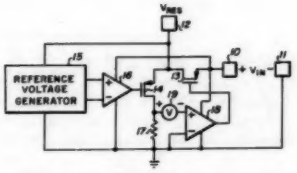
power supplying time interval is determined in accordance with said stored data and the detecting power source voltage as well as the determined power source frequency.

4,928,056

STABILIZED LOW DROPOUT VOLTAGE REGULATOR CIRCUIT

Robert A. Pease, San Francisco, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Oct. 6, 1988, Ser. No. 255,673
Int. Cl.[5] G05F *3/24*
U.S. Cl. 323—314 **5 Claims**



1. A voltage regulator circuit having an unregulated input supply terminal, a regulated output supply terminal and a supply return terminal, said circuit being composed of transistors each one having controlled current flow electrodes of high and low impedance and a current flow control electrode, said circuit comprising:

a series pass transistor having its low impedance electrode connected to said unregulated input supply terminal, its high impedance electrode connected to said regulated output supply terminal and a control electrode;

means driven from said regulated output supply terminal and connected to said control electrode of said series pass transistor thereby creating an overall negative feedback loop that operates to develop a control potential that holds said regulated output supply terminal at a constant potential level that is substantially independent of temperature, input supply voltage and output supply terminal current;

a shunt transistor having its low impedance electrode connected to said regulated supply output terminal, means for returning its high impedance electrode to said supply return terminal and a control electrode; and

means, responsive to the current flowing in said shunt transistor, connected to said control electrode of said series pass transistor to form an internal negative feedback loop, within said overall negative feedback loop, said internal negative feedback loop being operative to hold the current flow in said shunt transistor constant and said regulator circuit is thereby stabilized.

4,928,057

HIGH SPEED D.C. NON-CONTACTING ELECTROSTATIC VOLTAGE FOLLOWER

Bruce T. Williams, 454 South St., Lockport, N.Y. 14094

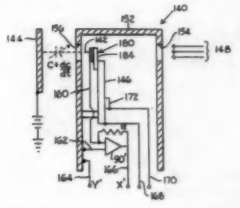
Division of Ser. No. 924,054, Oct. 28, 1986. This application Sep. 6, 1989, Ser. No. 403,695
Int. Cl.[5] G01R *1/04, 1/067*
U.S. Cl. 324—72 **5 Claims**

1. In a probe for an electrostatic voltmeter including a detector electrode adapted to be disposed toward a test surface bearing an electrostatic quantity to be measure, modulator means operatively associated with said detector electrode for modulating the capacitive coupling between said electrode and said surface, and means defining a path for radiation onto said surface for irradiating a region of said surface in registry with said electrode, the improvement comprising;

(a) a carrier element of material transparent to said radiation having a first surface adapted to be disposed toward said test surface;

(b) a first film of conductive material transparent to said radiation on said first surface of said carrier element, said first film occupying less than the total area of said first surface of said carrier element and defining said detector electrode;

(c) a second film of conductive material transparent to said radiation on the remainder of said first surface of said carrier element and spaced from said first film;



(d) said carrier element being operatively associated with said modulator means for modulating the capacitive coupling between said detector electrode and said surface; and

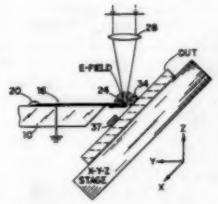
(e) said carrier element being disposed in said path for radiation such that radiation passes through said element onto said test surface and such that compensation is made for capacitive fringing effects by allowing for radiation of the fringing areas of the test surface coupled to said detector electrode by fringing capacitance.

4,928,058

ELECTRO-OPTIC SIGNAL MEASUREMENT

Steven Williamson, Ann Arbor, Mich., assignor to The University of Rochester, Rochester, N.Y.

Filed May 23, 1989, Ser. No. 355,514
Int. Cl.[5] G01R *29/14*
U.S. Cl. 324—96 **23 Claims**

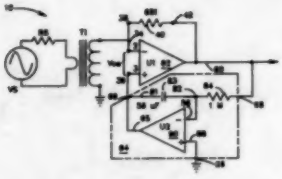


1. In a system for electro-optically measuring an electrical signal which produces a field with an electro-optic element through which said field passes and through which an optical signal also passes and is modulated by said field, said measurement being in accordance with the modulation of said optical signal, an improved probe which comprises a support having a surface with an edge, a strip of flexural material mounted on said surface and extending beyond said edge as a cantilever, said cantilever having a free end, said electro-optical element being mounted on said element between said edge and said free end and extending beyond said free end to a region where said optical signal intersects said element whereby said element is flexurally supported.

4,928,059
SINUSOIDAL CURRENT SENSE AND SCALING CIRCUIT

Hugh L. Franklin, La Mirada; Leslie H. Whatley, Corona, and George N. Klees, Anaheim, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 1, 1989, Ser. No. 345,939
Int. Cl.[5] G01R 19/00, 19/02
U.S. Cl. 324—123 R 4 Claims



1. A current measuring circuit for measuring a sinusoidal current from a sinusoidal current source referenced to a first reference potential for providing a scaled sinusoidal voltage proportional to said sinusoidal current, said scaled sinusoidal voltage being referenced to a second reference potential, said current measuring circuit comprising:

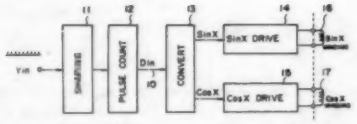
a transformer having a primary winding responsive to said sinusoidal current from said sinusoidal current source referenced to said first reference potential, and a secondary winding having a first terminal coupled to said second reference potential and a second terminal for providing a scaled sinusoidal current having an amplitude essentially equal to the amplitude of said sinusoidal current passing through said primary winding times the ratio of N1/N2, where N2 represents the number of turns on the secondary winding and N1 represents the number of turns on said primary winding;

scaling means for receiving said scaled sinusoidal current, for maintaining the voltage at said transformer secondary second terminal at essentially the same potential as said second reference potential and for providing an output voltage at an output terminal equal to said secondary current times a predetermined constant.

4,928,060
DRIVING CIRCUIT OF A CROSSED-COIL TYPE INSTRUMENT USING DIGITAL DATA PULSE PRODUCTION

Akio Ito, Konosu, Japan, assignor to Jeco Company, Ltd., Japan

Filed Feb. 1, 1989, Ser. No. 305,414
Claims priority, application Japan, Feb. 5, 1988, 63-25180
Int. Cl.[5] G01R 11/36; G01P 3/48
U.S. Cl. 324—143 11 Claims



1. A driving circuit for driving a crossed-coil type instrument used for reading a physical quantity in which a pair of windings surrounding a movable magnet carrying a pointer needle thereon are disposed to cross each other with a predetermined mechanical angle, comprising:

digital data conversion means supplied with an electrical signal representing said physical quantity to be measured for producing a digital data representing the electrical signal;

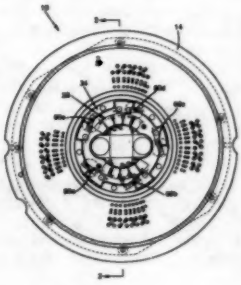
pulse data producing means supplied with said digital data for producing a number of pulses in correspondence with said digital data such that each of the pulses represents a stepwise increment of a step function which approximates either one of a sine function and a cosine function defined as a function of the digital data; and

drive signal generating means supplied with said pulses for synthesizing first and second analogue drive signals respectively representing a sine wave signal and a cosine wave signal which change sinusoidally with the input electrical signal therefrom, said driving signals being respectively supplied to said first and second windings for moving the magnet disposed in the first and second windings.

4,928,061
MULTI-LAYER PRINTED CIRCUIT BOARD

Michael S. Dampier, Burlington; Ronald J. Prilik, South Burlington, and Norman R. Rapoport, Williston, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 29, 1989, Ser. No. 330,293
Int. Cl.[5] G01R 31/02; H05K 1/11
U.S. Cl. 324—158 F 7 Claims



3. A multi-layer printed circuit board useful in a space transform device for testing semiconductor chips, wherein external signals are supplied to the chip for testing purposes,

said printed circuit board comprising,

a stack of dielectric members generally annular in shape and having a inner peripheral edge and an outer peripheral edge,

each of said dielectric members having a conducting member on one side thereof generally spaced from both peripheral edges,

each of said conducting members having a first portion extending to the outer peripheral edge at a given location and a second portion extending to an inner peripheral edge at a given location;

the positions of the electrical conductor at both the inner and outer peripheral edges of at least two of said dielectric members being spaced from each other along both of the peripheral edges,

a first plurality of conducting lands one for each location wherein there is a first portion of a conductor disposed along the outer peripheral edge,

and a second plurality of conducting lands, one for each location where there is a second portion of a conductor disposed along the inner peripheral edge of the stack,

whereby a signal applied to any land is conducted to the associated peripheral edge of only those conductor portions at those associated peripheral edges.

4,928,062

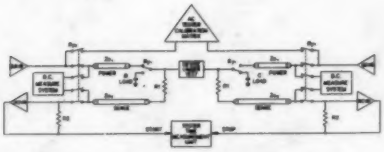
LOADING AND ACCURATE MEASUREMENT OF INTEGRATED DYNAMIC PARAMETERS AT POINT OF CONTACT IN AUTOMATIC DEVICE HANDLERS

Philip D. Miles, Lavendon, England; John R. Moody, Jr., Sherman, and Sheila O'Keefe, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 146,058, Jan. 20, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 368,157

Int. Cl.[5] G01R *1/02, 1/067*

U.S. Cl. 324—158 R **18 Claims**



1. In a test system for making accurate measurements of semiconductor devices under test, a connect device comprising:

(a) a controlled impedance multilayer printed circuit defining transmission lines and ground planes,

(b) electrical components mounted on said multilayer printed circuit,

(c) spatially fixed contact fingers secured to said electrical components for contacting said semiconductor devices under test,

(d) two lines from the test system to a device under test, one line being a power line from a driver circuit and the other line being a sense line to a receiver circuit, and

(e) said electrical components including means for selectively and reversibly switching in and connecting the semiconductor devices to load devices.

4,928,063

AUTOMATIC EDDY CURRENT CORRECTION

David A. Lampman, Lakewood; Michael A Morich, Richmond Hts., and Wayne R. Dannels, Willoughby, all of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Continuation-in-part of Ser. No. 118,865, Nov. 9, 1987, abandoned. This application May 10, 1989, Ser. No. 349,868

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—307 **23 Claims**

15. A magnetic resonance apparatus comprising: means for creating a magnetic field through an examination region;

a gradient field means for generating current pulses with a preselected profile;

a compensation means for selectively altering each current pulse with selectable frequency and gain correction factors;

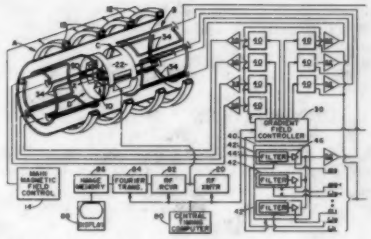
a gradient field coil means operatively connected with the compensation means for receiving the altered current pulse therefrom for generating a corresponding gradient across the main magnetic field;

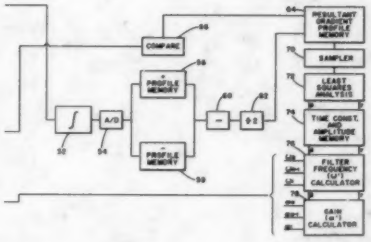
monitoring means disposed in the examination region for monitoring an induced magnetic field gradient;

analyzing means for analyzing the monitored gradient to determine a time constant and amplitude corresponding to a degrading eddy current;

a frequency correction factor deriving means for deriving the frequency correction factors from the determined time constant and amplitude from the analyzing means, the frequency correction factor deriving means being operatively connected with the analyzing means and the current pulse compensation means; and,

a gain correction factor deriving means for deriving the gain correction factors from the determined time constants, the frequency correction factors, and the amplitudes, the gain correction factor deriving means being operatively connected with analyzing means and the correction pulse compensation means.





4,928,064

HYBRID SURFACE COILS

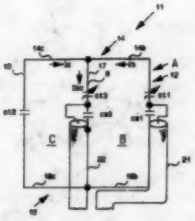
Hanan Keren, Kfar Saba, Israel, assignor to Elscint Ltd., Haifa, Israel

Filed Mar. 10, 1989, Ser. No. 321,299

Claims priority, application Israel, Mar. 18, 1988, 85786

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—322 **9 Claims**



1. A surface coil for use in a magnetic resonance (MR) system, said coil comprising:

a first loop, said first loop comprising:

first and second longitudinal substantially parallel conductors,

a pair of transverse conductors coupled to the first and second longitudinal conductors at spaced apart points thereon to form said first loop,

first means in the first loop for tuning and matching the loop to a first desired resonant frequency and to the system impedence,

a second and a third loop comprising a third longitudinal conductor connected between substantially equal voltage points on said pair of transverse conductors, and

second means for tuning and matching said second and third loops including said third longitudinal conductor to a second desired resonant frequency and to the system impedence.

4,928,065

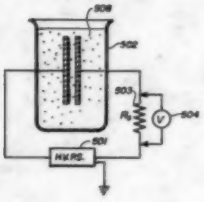
VOLTAMMETRY IN LOW-PERMITIVITY SUSPENSIONS

Gregg A. Lane, Kennett Square, Pa., and Kathryn Pearlstine, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 31, 1989, Ser. No. 331,990

Int. Cl.[5] G01N *27/42, 27/04*

U.S. Cl. 324—464 **21 Claims**



1. A method for determining the mobility of charged particles of a non-aqueous liquid test suspension of said charged particles, said suspension having a relative dielectric constant of less than 15, said method comprising the steps of:

(a) placing said suspension between two electrodes, said electrodes comprising capacitive elements;

(b) subjecting said suspension to a regularly varying electric field via said electrodes, wherein said electric field varies at a frequency greater than one Hertz and has a peak magnitude greater than one thousand volts per centimeter;

(c) measuring the resulting electric current through said suspension; and

(d) comparing said electric current to predetermined currents representative of the mobility of substantially similar suspensions.

4,928,066

CONTINUITY COUPLING IN A HARNESS MAKING MACHINE

Daniel T. Adlon, Harrisburg; Richard V. Spong, Etters; Stephen M. Cerqnone, and David E. Bickford, both of Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 7, 1989, Ser. No. 335,019

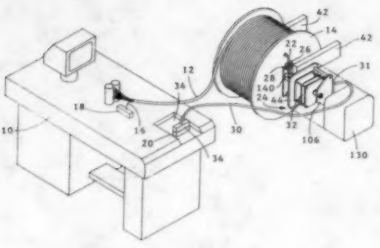
Int. Cl.[5] G01R *31/02*

U.S. Cl. 324—539 **9 Claims**

1. In a machine for automatically identifying and terminating wires of a multi-wire cable to corresponding terminals of a connector, said machine including: (1) a length of multi-wire cable wound about a reel, arranged for rotation with respect to said machine, said cable having a first end proximate the rotational axis of said reel and a second end extending from the periphery of said reel; (2) a frame having an axle for receiving any one of a plurality of different cable reels for rotation thereon; (3) apparatus for accepting said second end and applying a signal to a selected wire of said cable; (4) control means for monitoring a plurality of electrodes, which are non-rotationally coupled to said machine, identifying a specific one of said electrodes having said signal impressed thereon, and determining a desired terminal of said connector that corresponds to said selected wire; the improvement comprising:

means for releasably connecting the wires of said first end of said cable with corresponding ones of said plurality of electrodes while permitting rotation of said reel comprising:

(a) a first connector having terminals which are terminated to the wires of said first end of said cable; and



(b) rotational coupling means attached to said frame for electrically coupling said terminals of said first connector with corresponding electrodes of said plurality of electrodes.

4,928,067

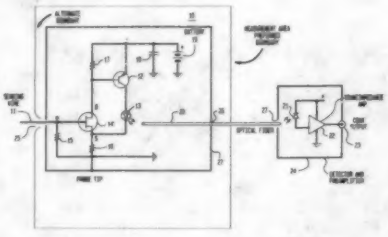
NON-INTRUSIVE FIBER OPTIC ELECTROMAGNETIC FIELD PROBE APPARATUS AND ASSOCIATED METHODS

Paul U. Lind, Phoenix, Ariz., assignor to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed Dec. 19, 1988, Ser. No. 286,545

Int. Cl.[5] G01R *33/12*

U.S. Cl. 324—96 **14 Claims**



1. A field probe apparatus for measuring relatively weak RF electromagnetic fields generated within shielded enclosures and operative to minimumly disturb said fields, comprising:

a sensing conductor means adapted to be inserted into said enclosure to provide a signal indicative of electromagnetic field strength;

amplifier means having an input coupled to said conductor means and operative to provide a voltage to current conversion gain at an output;

a light emitting device coupled to said amplifier output to provide a light signal according to the signal produced on said sensing conductor means; and

an optical fiber cable having a first end positioned to receive said light signal from said emitting device to transport said light signal to a second end of said fiber,

wherein said amplifier means includes a source of operating potential, transistor means having main electrodes coupled to said source of operating potential and a control electrode coupled to said sensing conductor means, and further circuit elements coupled to said transistor means

and having output terminals for providing a current output to said light emitting device,

said light emitting device being a light emitting diode (LED) having its anode and cathode coupled to said output terminals of said amplifier means, and said transistor means and other coupled circuit elements thereof having a very high input impedance at said control electrode and providing a very high voltage-to-current gain at said output terminals, such that relatively weak RF electromagnetic fields sensed by said sensing conductor means result in a current output sufficient to drive said LED, wherein said light emitted by said LED varies according to the signal provided by said sensing conductor means for applying said light signal to said first end of said optical fiber cable.

4,928,068

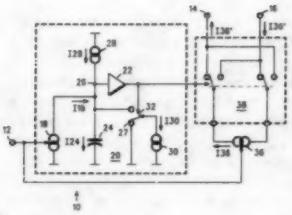
FM DEMODULATOR

William E. Main, Mesa, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed May 1, 1989, Ser. No. 345,816

Int. Cl.[5] H03D *3/00*

U.S. Cl. 329—324 **20 Claims**



1. An FM demodulator circuit having first and second outputs and which receives an FM signal, comprising:

oscillator means which is responsive to the FM signal for providing a switch control signal synchronized to the FM signal, said oscillator means operating at a free-running frequency when the FM signal is disabled;

circuit means response to the FM signal for providing alternating currents synchronized to the FM signal at first and second outputs; and

commutating means coupled between first and second outputs of the FM demodulator circuit and said first and second outputs of said circuit means, said commutating means being responsive to said switch control signal for alternately switching said first and second outputs of said circuit means between said first and second outputs of the FM demodulator circuit, wherein the average value of said alternating current flowing in the first and second outputs of the FM demodulator circuit over each half cycle of said switch control signal is proportional to the deviation of the frequency of the FM signal from said free-running frequency of said oscillator means.

4,928,069

AMPLIFYING SURFACE WAVE RECEIVER

Helmut Schink, and Ralf D. Schnell, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

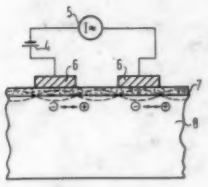
Filed Sep. 16, 1988, Ser. No. 245,379

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732857

Int. Cl.[5] H03F *3/04*

U.S. Cl. 330—5.5 **6 Claims**

1. An amplifying surface wave receiver for a surface wave element composed of a material which has the piezo effect and which can be rendered electrically conductive by local doping, characterized in that a region is formed in the upper portion of an insulating substrate body (8) which forms the surface wave element and which is formed of piezo effect material, said region forms a conductive channel (7) between at least two contact electrodes (6 and 6') which have a defined distance between them, said conductive channel formed such that oc-



curring piezo charges are in positions so as to modulate the conductivity of said channel (7); and a voltage source (4) with one terminal connected to one of said contact electrodes (6) and the other terminal connected to the other of said contact electrodes (6') through an alternating current detector (5).

4,928,070

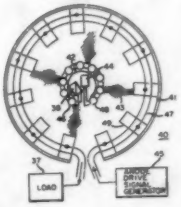
LOW-NOISE CROSSED-FIELD AMPLIFIER

George H. MacMaster, Lexington, and Lawrence J. Nichols, Burlington, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 241,798, Sep. 6, 1988, abandoned, which is a continuation of Ser. No. 143,206, Jan. 11, 1988, abandoned, which is a continuation of Ser. No. 71,534, Jul. 8, 1987, abandoned, which is a continuation of Ser. No. 946,260, Dec. 24, 1986, abandoned. This application Feb. 28, 1989, Ser. No. 317,098

Int. Cl.[5] H03F *3/58*; H01J *25/34*

U.S. Cl. 330—43 **56 Claims**



1. A low-noise crossed-field amplifier tube circuit for use with a frequency source providing an input signal to said tube circuit comprising:

a tube comprising an anode comprising a first slow-wave circuit having a first input and a first output;

a cathode;

an interaction space between said anode and cathode;

said cathode comprising a second slow-wave circuit having a second input and a second output, said cathode providing electrons to the interaction space between said cathode and said anode;

means providing a first portion of an input signal to the input of said first slow-wave circuit and providing a portion of said input signal to the input of said second slow-wave circuit;

means controlling the relative phase of said first portion with respect to said second portion of said input signal;

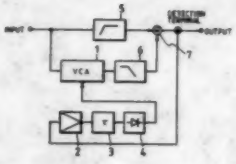
the output of said first slow-wave circuit being adapted to be connected to an output load; and

the output of said second slow-wave circuit being adapted to be connected to a termination.

4,928,071
LIMITER CIRCUIT

Hideo Yamamoto; Takeshi Sato; Toshikazu Yoshimi; Shuichi Mori, and Akio Tokumo, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 213,051
Claims priority, application Japan, Aug. 31, 1987, 62-131367[U]
Int. Cl.[5] H03G 3/20
U.S. Cl. 330—129 7 Claims



1. A limiter circuit for subjecting an output of a low frequency amplifier to amplitude limitation according to an output level thereof, which comprises:

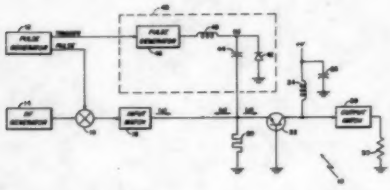
control voltage generating means connected to directly receive an output of said low frequency amplifier, to generate a control voltage according to the level thereof; and

voltage gain controlled means for amplitude-limiting only a low frequency component of said output of said low frequency amplifier, in accordance with said control voltage.

4,928,072
AMPLIFIER HAVING SUPPRESSED SPURIOUS FREQUENCY COMPONENTS

John C. Scott, Jamaica Plain, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Jul. 5, 1989, Ser. No. 376,475
Int. Cl.[5] H03F 1/26
U.S. Cl. 330—149 28 Claims



1. In combination:

an amplifier having input and output terminals;

means coupled to said amplifier input terminal for generating pulses of RF energy; and

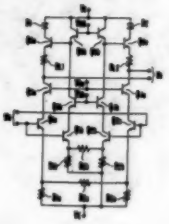
means for increasingly reflecting said RF energy from said amplifier input terminal during each of said pulses.

4,928,073
DC AMPLIFIER

Minoru Arai, and Yukihiro Katoh, both of Tokyo, Japan, assignors to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Apr. 14, 1989, Ser. No. 338,878
Claims priority, application Japan, May 7, 1988, 63-110795
Int. Cl.[5] H03F 3/45
U.S. Cl. 330—252 2 Claims

1. A DC amplifier comprising a first differential amplification circuit including first and second transistors forming a first differential amplification transistor pair, an emitter resistor connected between emitters of said first and second transistors, and load resistors connected to collectors of said first and second transistors respectively, and a second differential amplification circuit including third and fourth transistors equivalent to said first and second transistors and forming a second differential amplification transistor pair, bases of said third and fourth transistors being commonly connected to bases of said first and second transistors, respectively, and an emitter resistor connected between emitters of said third and fourth transistors, wherein a resistance of each of said load resistors is set to

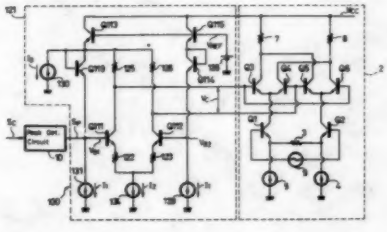


be equal to that of each of said emitter resistors, emitters of fifth and sixth transistors equivalent to said first and second transistors are respectively connected to the collectors of said first and second transistors through said respective load resistors, emitters of seventh and eighth transistors equivalent to said third and fourth transistors are respectively connected to collectors of said third and fourth transistors, bases of said fifth and sixth transistors are respectively connected to the emitters of seventh and eighth transistors, and biases of said first to eighth transistors are set to be close to each other.

4,928,074
AUTOMATIC GAIN CONTROL CIRCUIT

Mitsuru Sato; Tetsuya Iizuka; Kiyoshi Furuya; Norio Shoji, and Masato Sekine, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jun. 13, 1989, Ser. No. 365,672
Claims priority, application Japan, Jun. 17, 1988, 63-149436
Int. Cl.[5] H03F 3/45
U.S. Cl. 330—254 7 Claims



1. An automatic gain control circuit comprising:

a variable gain amplifier circuit;

a signal level detecting circuit connected to an output of said variable gain amplifier circuit for generating a detect signal having a level that changes in response to a signal level of said output; and

a gain control circuit for controlling a gain of said variable gain amplifier circuit in accordance with the signal level of said detect signal and comprising a differential amplifier circuit having first and second input terminals, said first input terminal being connected to said signal level detecting circuit for receiving said detect signal;

first reference voltage source means also connected to said first terminal of said differential amplifier for selectively providing a first predetermined voltage to said first terminal of said differential amplifier in response to said signal level of said detect signal; and

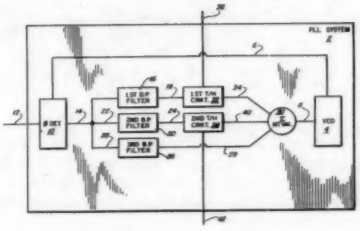
a second reference voltage source connected to said second input terminal of said differential amplifier for providing a second predetermined voltage, whereby output signals from said differential amplifier are fed to said variable gain amplifier circuit.

4,928,075

MULTIPLE BANDWIDTH FILTER SYSTEM FOR PHASE LOCKED LOOP

Michael D. Leis, Framingham, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 26, 1989, Ser. No. 371,494
Int. Cl.[5] H03H *21/00*; H03L *7/10*
U.S. Cl. 331—17 **24 Claims**



1. A method of sequentially filtering an input signal having a frequency range through a plurality of filters, each filter having a passband ranging from a widest passband with a widest selected frequency range to a narrowest passband with a narrowest selected frequency range, comprising the steps of:

coupling said input signal to the input of each said filter;

combining the outputs of said filters to form a filtered output signal having a frequency range corresponding to said widest passband filter; and

sequentially holding the output level of each of said filters in declining order of their passband frequency range, beginning from said widest passband filter to said narrowest passband filter until all of the output levels of said filters are held constant except for said narrowest passband filter, for sequentially changing the frequency range of said filtered output signal from the frequency range of said widest passband filter to the frequency range of said narrowest passband filter.

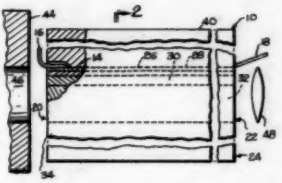
4,928,076

ULTRAFAST OPTICAL MODULATOR

Gerard A. Mourou; John A. Nees, both of Rochester, and Steven L. Williamson, Henrietta, all of N.Y., assignors to The University of Rochester, Rochester, N.Y.

Continuation of Ser. No. 242,247, Sep. 9, 1988, abandoned. This application Oct. 23, 1989, Ser. No. 425,457
Int. Cl.[5] G02B *6/10*
U.S. Cl. 330—4.3 **12 Claims**

1. An optical modulator operative over a broad band of frequencies so that pulses in the picosecond range are useful as a modulating signal which comprises a substrate of solid state electro-optic material longer in length than in width and having opposite sides, at least one electrode on one of the opposite sides and extending along the length thereof, said substrate defining an optical wave guide for the optical signal to be modulated in said substrate parallel to said electrode, a superstrate of solid state dielectric material parallel to and in contact with said electrode and disposed along said one side, said superstrate, substrate and said electrode defining an electrical transmission line along which said pulses propagate, said line having an effective bulk dielectric constant, the square root of which is substantially equal to the index of refraction of said



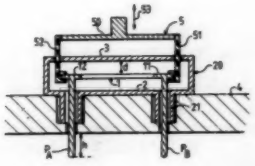
substrate, said line paralleling said optical wave guide along which said optical and electrical signals can travel, and said optical signal being modulated by said electrical signal.

4,928,077

TUNABLE MICROWAVE COUPLER WITH MECHANICALLY ADJUSTABLE CONDUCTORS

Francois Devaux, Paris; Norbert Herail, Jouy le Moutier; Denis Lefevre, Paris, and Jean-Pierre Lehuede, Aubergenville, all of France, assignors to Thomson-CSF, Paris, France

Filed Aug. 23, 1988, Ser. No. 235,322
Claims priority, application France, Aug. 28, 1987, 87 12040
Int. Cl.[5] H01P *5/18*
U.S. Cl. 333—111 **3 Claims**



1. A microwave coupler of the three-plate type comprising a ladder-shaped central conductor (1) placed between two conducting plates (2,3) forming ground plates, said central conductor having two substantially parallel conductors (11,12) connected by conductors (13,14,15) which are substantially perpendicular to said parallel conductors, said parallel conductors (11,12) having opposite ends which form the terminals of said coupler, two conducting plungers (P_A, P_B) respectively fixed to two predetermined parts (A,B) of said parallel conductors (11,12) and designed to penetrate a microwave waveguide (4), said plungers being aligned along a direction of propagation of waves within said waveguide, externally controllable means for varying (51–59) the distance between said predetermined parts (A,B) and said ground plates through a flexure of said central conductor (1), thus varying the length by which said plungers (P_A, P_B) penetrate into said waveguide (4), said means for varying comprising at least one rod (51) rigidly mechanically coupled to and electrically insulated from said predetermined parts (A,B) with mechanical translation of said rod providing for variation of said distance.

4,928,078

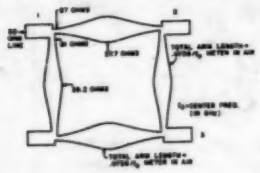
BRANCH LINE COUPLER

Chandra Khandavalli, Fremont, Calif., assignor to Avantek, Inc., Santa Clara, Calif.

Filed Dec. 22, 1988, Ser. No. 288,686
Int. Cl.[5] H01P *5/18*
U.S. Cl. 333—109 **8 Claims**

1. A branch line coupler for transmission line signal condi-

tioning of the type having a plurality of branch line coupler arms connected at a junction point, each said branch line coupler arm having a substantially linear shape including a middle



and two ends, wherein the improvement comprises each said branch line coupler arm thinning in a curvilinear manner from the middle toward each end.

4,928,079

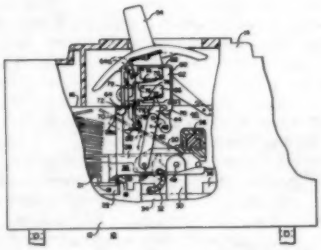
CIRCUIT BREAKER AUXILIARY SWITCH ASSEMBLY

Andrew J. Male, Export, and Melvin A. Carrodus, Brighton Twp., Beaver County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 25, 1988, Ser. No. 223,841

Int. Cl.[5] H02B *1/08*

U.S. Cl. 335—13 **4 Claims**



1. A circuit braker, comprising:

an electrically insulating housing;

a circuit breaker means within the housing and comprising first and second contacts operable between open and closed positions;

a releasable mechanism in an initial position and movable when released to a tripped position to effect automatic opening of the contacts;

the first contact carrying arm movable between open and closed positions of the contacts; and

auxiliary switch means including a plunger in the path of movement of the arm for opening or closing an auxiliary circuit when the arm is actuated, said plunger having a flexible portion capturing said arm which accommodates overtravel of said arm when said arm is actuated.

4,928,080

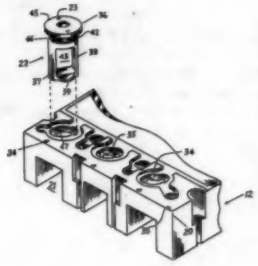
MOLDED CASE CIRCUIT BREAKER LINE TERMINAL PLUG

Linda Y. Jacobs, Berkhamsted; Joseph M. Palmieri, Southington, and James I. Smith, Avon, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,947

Int. Cl.[5] H01H *9/02*

U.S. Cl. 335—202 **17 Claims**



1. A molded case circuit breaker comprising:

a circuit breaker case and cover;

a pair of separable contacts arranged within said case under control of an operating mechanism to interrupt circuit current upon occurrence of an overcurrent condition through said contacts;

a plurality of line terminal connectors arranged within a corresponding plurality of line terminal compartments at one end of said circuit breaker case;

a corresponding plurality of line terminal access openings formed within said circuit breaker cover in registry with said line terminal connectors;

a corresponding plurality of arc gas egress slots formed within said circuit breaker case perpendicular to said access openings; and

line plugs removably arranged within said access openings thereby preventing access to said line terminal connectors while allowing egress of said arc gases, said plugs comprising a cylindrical top having tool-receiving recess means formed in a top surface thereof, said plugs further comprising a planar body member having a plurality of longitudinal slots formed therein.

4,928,081

METHOD OF MASS PRODUCING SUPERCONDUCTING PERSISTENT CURRENT RINGS

Herbert A. Leupold, Eatontown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 13, 1989, Ser. No. 322,381

Int. Cl.[5] H01F *7/22*

U.S. Cl. 335—216 **6 Claims**

1. Method of mass producing superconducting rings with a persistent current flowing around the periphery of each ring and with accompanying magnetic flux trapped within the interior cavity of each ring from superconducting rings with no persistent current flowing around each ring and with no magnetic flux trapped within the interior cavity of each ring,

said method comprising passing the superconducting rings with no persistent current flowing around each ring through the maximum magnetic field of a tapered magnetic field wherein the tapered magnetic field is tapered in strength so that each ring passing through the maximum magnetic field which is above the critical magnetic field becomes normal thereby passing through all of the magnetic flux to which its cross section is exposed and then passing each ring to a region of the tapered magnetic field lower in strength than the critical magnetic field whereby each ring becomes superconducting again and traps the magnetic flux to which its cross section is exposed.

4,928,082

MOLDED RESIN CASING OF ELECTRONIC PART WITH FLEXIBLE FLAT CABLE

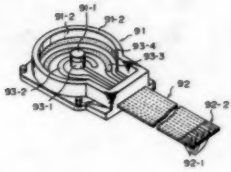
Nobuyuki Yagi, Tokyo; Jiro Inagaki, Tokyo; Kozo Morita, Tokyo; Yasutoshi Kaku, Kanagawa; Nobuyuki Kikuchi, Kanagawa, and Shinji Mizuno, Kanagawa, all of Japan, assignors to Teikoku Tsushin Kogyo Co., Ltd., Kanagawa, Japan

Filed Aug. 22, 1988, Ser. No. 234,946

Claims priority, application Japan, Sep. 7, 1987, 62-224239; Sep. 22, 1987, 62-238449; Dec. 22, 1987, 62-325679

Int. Cl.[5] H01C *10/34*

U.S. Cl. 338—174 **6 Claims**



1. A device comprising:

a molded resin casing, and said resin casing having means for receiving a flexible board therein;

a flexible board integrally attached to and received in said receiving means of said molded resin casing, said flexible board including a synthetic resin film having a first plurality of electrical conductor patterns defined thereon, and means on said flexible board for slidably receiving an electronic part for electrically contacting an electronic part with said first plurality of electrical conductor patterns, said flexible board being integrally attached to said molded resin casing when said resin casing is molded by injecting a molten synthetic resin, and said flexible board being oriented during the molding of said resin casing for causing said first plurality of electrical conductor patterns to be exposed within said synthetic resin for contacting an electronic part received therein; and

a flexible flat cable integrally attached to said flexible board, said flexible flat cable including a synthetic resin film having a second plurality of electrical conductor patterns defined thereon, said second plurality of electrical conductor patterns being directly electrically connected with said first plurality of electrical conductor patterns, and said flexible flat cable extending outwardly away from said synthetic resin casing.

4,928,083

WIPER FOR VARIABLE ELECTRICAL RESISTOR

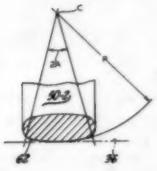
Dewey M. Sims, Jr., Wayne, and Ray E. Mick, Troy, both of Mich., assignors to Colt Industries Inc., New York, N.Y.

Filed Apr. 10, 1989, Ser. No. 335,797

Int. Cl.[5] H01C *1/12*

U.S. Cl. 338—202 **6 Claims**

1. For use in an operating system wherein a movable control member is adjustably movable over a selected range of controlled movement and is also subjected to uncontrolled movement such as might be induced by extraneous vibration, shock loading or the like; a variable electrical resistor adapted to be connected in an electrical circuit to electrically signal the position of said control member within its selected range of movement, said resistor including a fixedly located, flat, elongate electrical resistor member, electrically conductive wiper means mechanically coupled to said control member for movement therewith relative to said resistor member and including an elongate finger-like strip having a curved knuckle portion



slidably engaged with said resistor member for movement along said member in response to said controlled movement of said control member, said knuckle portion of said strip having a transverse cross-sectional configuration elongated transversely of the finger and having rounded opposite side edge surfaces and a contact surface extending between said side surfaces in facing opposed relationship to said resistor member, the radius of curvature of said contact surface being substantially greater than that of said side surfaces.

4,928,084

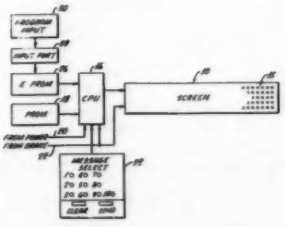
COMBINED MESSAGE DISPLAY AND BRAKE LIGHT

Steven M. Reiser, 1900 Almont Ave., #107, Anaheim, Calif. 92805

Filed Jan. 23, 1989, Ser. No. 300,790

Int. Cl.[5] B60Q *1/44*

U.S. Cl. 340—479 **14 Claims**



8. A method of providing a rearwardly directed message from a vehicle comprising the steps of:

mounting upon a rear portion of the vehicle a display screen having an array of light emitting elements,

providing a plurality of sets of data, each set representing a message to be displayed,

employing a selected one of said sets to energize a group of said elements to display a message represented by the selected set, and

energizing a major part of said array when brakes of the vehicle are applied,

said step of energizing a major part of said array comprising concomitantly interrupting display of said message represented by the selected set.

4,928,085

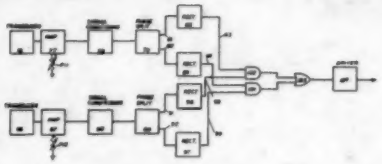
PRESSURE CHANGE INTRUSION DETECTOR

Elden E. DuRand, III, Crestwood, and William K. Logsdon, Louisville, both of Ky., assignors to Bluegrass Electronics, Inc., LaGrange, Ky.

Continuation of Ser. No. 469,089, Feb. 23, 1983, abandoned. This application May 30, 1989, Ser. No. 359,045

Int. Cl.[5] G08B *13/16*

U.S. Cl. 340—544 **3 Claims**



1. A signalling device to detect coincidence of first and second selected conditions in a selected area where

the first selected condition is infrasonic air pressure waves having frequencies below 20 cycles per second and the second selected condition is selected sonic frequency waves, said device comprising;

a pressure sensitive transducer means responsive to said infrasonic air pressure waves to provide an alternating electrical signal;

an amplifier means to selectively amplify said alternating electrical signal to provide an amplified alternating output signal;

a rectifier means to rectify said amplified alternating output signal to provide a first signal;

a sonic frequency transducer means responsive to selected frequencies to provide a second alternating electrical signal;

a second amplifier means to selectively amplify said second alternating electrical signal to provide a second amplified alternating output signal;

a second rectifier means to rectify said second amplified alternating output signal to provide a second rectified signal;

a switch means, including a coincidence detector responsive to the first and second rectified signals, which activates an alarm in response to coincident receipt of the first and second rectified signals.

4,928,086

PAGER RECEIVER HAVING A COMMON TIMER CIRCUIT FOR BOTH SEQUENTIAL LOCK-OUT AND OUT-OF-RANGE

George Drapac, Boca Raton, and Walter J. Grandfield, Lake Worth, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 30, 1989, Ser. No. 302,876

Int. Cl.[5] H04Q *7/02*; H04B *7/00*

U.S. Cl. 340—825.440 **8 Claims**

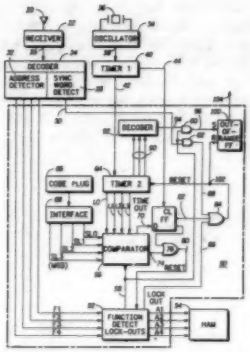
1. A pager receiver including a receiver for receiving transmitted RF signals and converting such signals to received signals for use within the paper receiver, decoder means for decoding the received signals in accordance with a coded paging system format which includes sync words and address function data to generate sync pulse timing signals in response to decoded sync words and to generate a function detect signal in response to a corresponding decoded address function of the pager receiver, means governed by said function detect signal to cause an alert annunciation corresponding to the decoded address function, and a source of timing signals, said pager receiver comprising:

means for inhibiting an alert annunciation in response to a repeat decoding of a corresponding address function within a first selected time interval of an initial decoding thereof;

means for detecting a lack of decoded sync words over a second selected time interval and for causing an out-of-range annunciation in response to said detection; and

single timer means coupled to both of the inhibiting means and the detecting means and responsive to said timing signals for generating an initiated one of either the first or second selected time intervals;

said inhibiting means including lock-out means corresponding to each address function of the pager receiver, said lock-out means activated by the function detect signal generated in response to the initial decoding of the corresponding address function to initiate the generation of the first selected time interval by the single timer means and to



inhibit an alert annunciation in response to subsequently generated corresponding function detect signals for the duration of the first selected time interval generated by the single timer means;

said detecting means including first means responsive to the sync pulse timing signals to initiate at each sync pulse timing signal the generation by the single timer means of the second selected time interval which is substantially longer in time than the time interval between any two successive sync pulse timing signals; second means for generating a set signal at the term of the second selected time interval generated by the single timer means, whereby no set signal is generated as long as sync pulse timing signals are generated; and third means responsive to said set signal for causing the out-of-range annunciation.

4,928,087

PHASE-STABILIZED, PHASE-COUPLED RESONANT CIRCUIT

Hans-Diedrich Kreft, Dassendorf; Holger MacKenthun, and Wolfgang Hass, both of Hamburg, all of Fed. Rep. of Germany, assignors to Angewandte Digital Electronik GmbH, Fed. Rep. of Germany

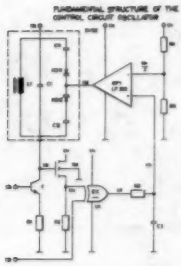
Filed Mar. 27, 1989, Ser. No. 329,309

Int. Cl.[5] H03B *19/00*; G06K *19/06*; H04Q *7/00*

U.S. Cl. 340—825.71 **1 Claim**

1. An apparatus for non-contacting signal and energy transmission between a substantially immobile part as a microstation and a mobile part as a microunit, the microstation having an oscillator operable to produce to an oscillation and having means for dividing the oscillation into two separate oscillations, means for forcing a phase shift on a first of the two separate oscillations relative to a second of said two separate oscillations depending upon a data stream, the phase shifted oscillation being supplied to the mobile part via a first coil pair

and the other oscillation being supplied to the mobile part via a second coil pair and the power transmission ensuing via the same coil pairs with the assistance of the two oscillations, the mobile part having a phase comparator to which the transmitted oscillations are Supplied, the phase comparator acquiring the data from the data stream with reference to the phase shift and the data transmission from the mobile part to the immobile part ensuing on the basis of simultaneous load modification at both coils of the mobile part so that it is assured that documentation of the load variation is possible at one of the two coils of the microstation even given an interchanged allocation of the coil pairs, the improvement comprising: a first resonant circuit including a first inductance, a first capacitance, and a first capacitive diode, said first resonant circuit being resonant stabilized in a phase shifted fashion and having a voltage tap, a first transistor through which said first resonant circuit is driven by two coherent oscillations of fixed phase shift, said first transistor being connected in series with said first resonant circuit so that said resonant circuit acts as a real ohmic resistance resulting in a phase shift of exactly 180 degrees between an oscillation generating signal applied at a base of said first transistor and a signal at said voltage tap of said first resonant circuit when said first resonant circuit is in resonance and deviating from said 180 degree phase shift when said first



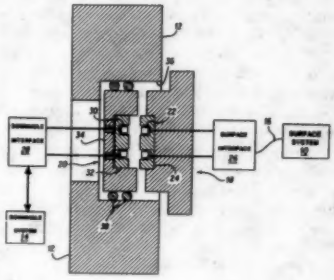
resonant circuit is not in resonance; a second resonant circuit having a second inductance, a second capacitance, and a second capacitive diode, said second resonant circuit being resonant stabilized in phase-shifted fashion; a second transistor connected in series with said second resonant circuit; logic elements connected to convert deviations from said 180 degrees phase shift into a series of pulses having a pulse-duty factor dependent on phase shift; an R-C combination connected at an output of said logic elements to integrate said pulse-duty factor and produce a voltage value; an operational amplifier connected to compare said voltage value to a standard value, an output of said operational amplifier connected to drive said first capacitive diodes to stabilize said first resonant circuit to a supply frequency; a coherent phase-shifted part available as an oscillation generating signal being supplied to said second inductance of said second circuit; said second resonant circuit being stabilized to the same frequency as said first resonant circuit so that both frequency stabilized oscillations have a defined phase shift relative to one another, the frequency stabilized oscillations being available frequency stabilized and phase shifted via said first and second inductances of the immobile part to allow recognition and evaluation of the phase shift and guaranteeing a time defined standardized BAUD rate of the data stream on the basis of the frequency stability.

4,928,088

APPARATUS FOR EXTRACTING RECORDED INFORMATION FROM A LOGGING TOOL

Bruno Jorion; Christian Galiano, both of Houston, and Peter Wraight, Missouri City, Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Mar. 10, 1989, Ser. No. 321,708
Int. Cl.[5] G01V *1/00*
U.S. Cl. 340—854 **11 Claims**



1. A communications system for providing communication between equipment carried within a well logging apparatus having a longitudinal axis and a side wall with an aperture formed in said side wall, and equipment external to said logging apparatus, said system comprising: a. A means for transferring information through said aperture without passing current through an electrical contact through said aperture, said means comprising:

a first portion in electrical communication with the logging apparatus equipment and mounted in said aperture; and

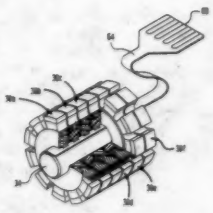
a second portion in electrical communication with the external equipment and configured to be movably placed within said aperture in juxtaposition with said first portion.

4,928,089

HALL EFFECT PRINTWHEEL ENCODER

Donatas V. Gasiunas, Carmel, N.Y., and Anthony Storace, Norwalk, Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 21, 1987, Ser. No. 136,085
Int. Cl.[5] G08C *19/06*
U.S. Cl. 340—870.31 **9 Claims**



1. Apparatus for encoding the position of a wheel comprising:

(a) a linear Hall-effect sensor fixed to a shaft at a point near the periphery thereof, said Hall-effect sensor providing an output signal whose magnitude is in correspondence to the magnetic flux thereat;

(b) a magnetic means mounted in said shaft adjacent said Hall-effect sensor for providing magnetic flux therethrough;

(c) a wheel rotatably mounted on said shaft at said Hall-effect sensor for rotation about the sensor;

(d) a flux-conducting ring disposed within said wheel and encircling said shaft, said ring having an inner portion including slots alternating with flux-conducting teeth extending inwardly toward the shaft at varying depth to provide thereby a varying gap between said Hall-effect sensor and said flux-conducting teeth in dependence on the angular position of the wheel, the slots providing a minimum signal between the signal associated with each tooth, creating thereby upon rotation of the wheel an alternating signal whose magnitude depends upon the dimension of the gaps between the sensor and the teeth as well as minimum signal between adjacent teeth;

(e) means for receiving and measuring the magnitude of the output signal from the Hall-effect sensor; and

(f) wherein a predetermined magnitude of the signal for each tooth positioned in juxtaposition to the sensor corresponds to a predetermined angular position of said wheel relative to said shaft whereby the wheel position is determinable both by counting alternations to reach a selected position and a measured magnitude of the signal at each tooth position.

4,928,090

AROUSAL LEVEL JUDGING APPARATUS AND METHOD

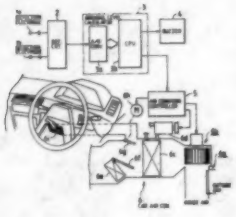
Tomohisa Yoshimi, Gamagori; Satoru Kodama, Oobu; Takeshi Yoshinori, Chiryu, and Masahiko Ito, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Dec. 8, 1988, Ser. No. 281,074

Claims priority, application Japan, Dec. 9, 1987, 62-312972; Jul. 18, 1988, 63-178793

Int. Cl.[5] G08B *21/00*

U.S. Cl. 340—575 **12 Claims**



1. An arousal level judging apparatus comprising:

(a) skin potential level detection means for detecting a skin potential level of a human body;

(b) level change detection means for detecting a degree of change in a level of an output signal of said skin potential level detection means over a predetermined interval;

(c) a comparing means for comparing said degree from said level change detection means with a first predetermined value to detect a pulse-like change in said skin potential level;

(d) convergence detection means responsive to an output signal from said comparing means for detecting a non-pulse like portion in said skin potential level by analyzing successive changes of gradient determined by said degree from said level change detection means;

(e) storing means for storing said skin potential level as a reference value when said non-pulse like portion is detected by said convergence detection means; and

(f) arousal level detecting means responsive to said skin potential level from said skin potential level detection means and to said reference value from said storing means for determining arousal state and non-arousal state of said human body using the relationship between said skin potential level and said reference value.

4,928,091

APPARATUS FOR DETECTING POSITION OF MOVING OBJECT

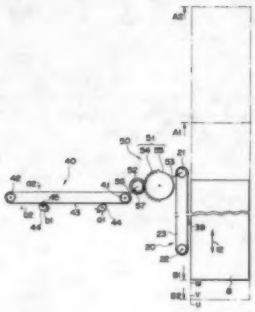
Yukikazu Masuzawa, Nishinasuno, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 837,070, Mar. 5, 1986, abandoned. This application Jul. 12, 1988, Ser. No. 217,792

Claims priority, application Japan, Mar. 6, 1985, 60-42841

Int. Cl.[5] G08B *21/00*

U.S. Cl. 340—686 **10 Claims**



1. An apparatus for detecting a position of a moving object, said moving object moving along a first track having a target position located within a predetermined range, said position detecting apparatus comprising:

a movable member movable along a second track;

detecting means for detecting whether said movable member has reached a predetermined point on the second track; and

transmitting means for transmitting a movement of said moving object to said movable member, said transmitting means transmitting the movement of said moving object to said movable member at a first transmission ratio of (moving distance of the movable member/moving distance of the moving object) when said moving object passes within a predetermined range on the first track and at a second transmission ratio smaller than the first transmission ratio when said moving object passes outside the predetermined range on the first track,

whereby, when said moving object reaches the target position on the first track, said movable member reaches the predetermined point on the second track, thus detecting that said moving object has reached the target position.

4,928,092

PATTERN INPUT UNIT

Yoshio Iizuka, Tokyo, Japan, assignor to Kokoku Rubber Industry Company Limited, Tokyo, Japan

Filed Oct. 28, 1987, Ser. No. 114,216

Claims priority, application Japan, Oct. 30, 1986, 61-257018

Int. Cl.[5] G09G *1/16*

U.S. Cl. 340—707 **1 Claim**

1. A pattern input device comprising

a tablet and a pen,

means for detecting contact between said pen and said tablet and for generating a pen touch output signal representative thereof,

means electrically connected to said tablet for generating a coordinate signal representative of the position of contact between said pen and said tablet, said coordinate signal

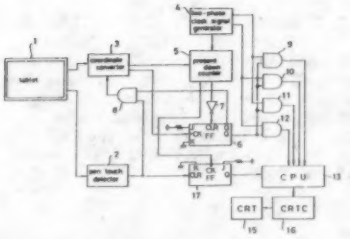
generating means comprising a down counter which, upon contact between said pen and said tablet, counts down from a value representative of the position of contact between said pen and said tablet to zero, said down counter generating a first down count signal when the count equals one and a second down count signal when the count equals zero,

a central processing unit,

a clock having an output clock signal,

means for electrically connecting the clock signal to said down counter so that said down counter counts down in unison with the clock signal,

means for electrically connecting the clock signal as an input signal to said central processing unit during down counting of said down counter and means responsive to said second down count signal for disconnecting said clock signal from said central processing unit,



a cathode ray tube display electrically connected to said central processing unit for displaying contact and movement of said pen on said tablet, and

means for providing an input signal to said central processing unit representative of continuous movement of said pen on said tablet, said last mentioned means comprising a flip flop having an output connected to said central processing unit, said flip flop having a clear input connected to receive said pen touch output signal and a clock input connected to receive said first down count signal so that, when said pen is moved out of contact from said tablet, said first down count signal sets the output from said flip flop to a first state while said first down count signal sets the output from said flip flop to a second state when the pen contacts said tablet.

4,928,093

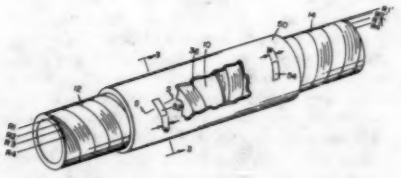
CURSOR CONTROL MECHANISM

Abdul W. b. A. Rahman, Singapore, Singapore, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 10, 1989, Ser. No. 309,833

Int. Cl.[5] G09G 1/00

U.S. Cl. 340—709 **14 Claims**



1. A hand-controlled mechanism for producing signals to move the position of a cursor in a computer display, the mechanism comprising:

shaft means having an elongated axis;

a plurality of conductor means wrapped about said shaft means;

drive means for applying an energizing signal to a sequence of said conductor means;

cylindrical means mounted on said shaft means and moveable about and along said shaft means in both rotational and translational directions, said cylindrical means provided with conductive plate means which overlap a plurality of said conductor means, said conductive plate means acting to couple an energizing signal applied to a conductor means to other conductor means overlapped by said conductive plate means; and

decoder means for sensing said coupled energizing signals and providing an output indicative of the position of said cylindrical means to accordingly control said cursor position.

4,928,094

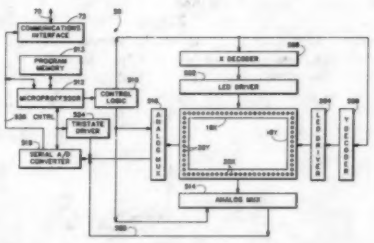
BATTERY-OPERATED DATA COLLECTION APPARATUS HAVING AN INFRARED TOUCH SCREEN DATA ENTRY DEVICE

Mark L. Smith, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 25, 1988, Ser. No. 148,421

Int. Cl.[5] G09G 3/02

U.S. Cl. 340—712 **23 Claims**



1. Photoelectric apparatus comprising:

an emitter element for intermittently emitting a beam of electromagnetic radiation,

a detector element for receiving radiation emitted by the emitter element, the detector element having a semiconductor junction and having an output terminal at which a voltage representative of intensity of electromagnetic radiation falling on the junction is developed, and

switch means for intermittently grounding the output terminal of the detector element when the emitter element is not emitting the beam of electromagnetic radiation.

4,928,095

ACTIVE MATRIX-ADDRESSED PICTURE DISPLAY DEVICE

Yukito Kawahara, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan

Filed Dec. 16, 1983, Ser. No. 562,079

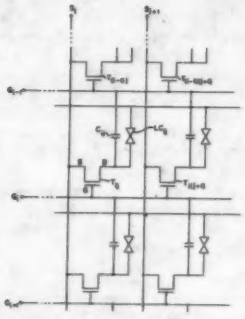
Claims priority, application Japan, Dec. 23, 1982, 57-228184

Int. Cl.[5] G09G 3/36

U.S. Cl. 340—784 **4 Claims**

1. An active matrix-addressed picture display device comprising: m row address electrodes which are scanned in one direction during use of the device; n column signal supply electrodes; and a plurality of picture elements arranged in m rows and n columns, each picture element comprising a liquid

cyrstal cell, a switching transistor having a gate electrode connected to one row address electrode, a source electrode connected to one column signal supply electrode and a drain electrode connected to the liquid crystal cell, and a single



capacitor one side of which is connected to the drain electrode of said switching transistor and the other side of which is connected to a preceding row address electrode preceding the picture element of which the capacitor forms a part in the scanning direction.

4,928,096

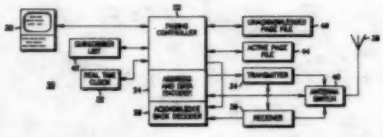
PAGING TERMINAL APPARATUS WITH MESSAGE STORAGE AND RETRANSMISSION CAPABILITY AND METHOD THEREFOR

Victoria A. Leonardo, and Leonard E. Nelson, both of Boynton Beach, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 121,362, Nov. 16, 1987, abandoned. This application Apr. 17, 1989, Ser. No. 338,453

Int. Cl.[5] H04Q *9/00*

U.S. Cl. 340—825.440 **12 Claims**



1. Paging terminal apparatus, for use with pagers having the capability to acknowledge back receipt of an address identifying the pager, wherein paging messages intended for particular pagers initially failing to acknowledge back address reception may be automatically stored for subsequent transmission later, said terminal apparatus comprising:

means for storing including establishing an active page file into which the addresses of the pagers are temporarily stored, along with the messages intended for the pagers;

means for transmitting, coupled to said means for storing, for initially sending the paper addresses stored in the active page file to the pages; and

means for receiving the acknowledge back responses generated by the pagers acknowledging back address reception,

said means for transmitting, being responsive to the received acknowledge back responses, for subsequently sending the messages stored in the active page file which are intended for the pagers acknowledging back reception of the initial address transmission,

said means for storing further including an unacknowledged page file into which the messages intended for the particular pagers failing to acknowledge back reception of the initial address transmission within a predetermined time period are stored along with the particular pager addresses for subsequent transmission later, and

said means for transmitting, periodically retransmitting the addresses of the particular pagers initially failing to acknowledge back, and further transmitting the stored messages intended for each of the particular pagers when such pagers subsequently acknowledge back reception of its retransmitted address.

4,928,097

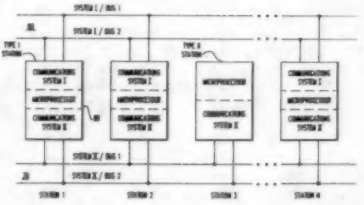
REAL TIME PROCESS CONTROL USING MULTIPLE COMMUNICATION NETWORKS

Carl J. Staub; Kirk D. Houser; Donald J. Jones; Robert T. Ihrman, all of Pittsburgh; Donald A. Poepsel, Cheswick, and Warren A. Edblad, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 10, 1988, Ser. No. 206,080

Int. Cl.[5] H04Q *1/00*

U.S. Cl. 340—825.500 **6 Claims**



1. A communications arrangement for a distributed process control system having a plurality of stations capable of sending and receiving data of at least two types, said communications arrangement comprising:

a first communication channel over which at least two of said plurality of stations are connected;

a second communication channel, independent of said first communication channel, over which said plurality of stations are connected;

said first communication channel having a faster response time than said second communication channel;

processing means disposed at each of said plurality of stations for determining which of said first and second communication channels such data is to be communicated over, said processing means making such determination as a function of the type of data to be communicated; and,

wherein all data transmitted over said first communication channel is shared entirely by all stations connected to said first communication channel and data of a second type which is transmitted over said second communication channel, is distributed to stations disposed on said second communication channel on a preselected need to know basis and further wherein said second type of data to be transmitted over said second communication channel is control data which is utilized in a substantially immediate manner by said distributed process control system, said control data being distinguishable from data communicated over said first communication channel which is characterized as historical data.

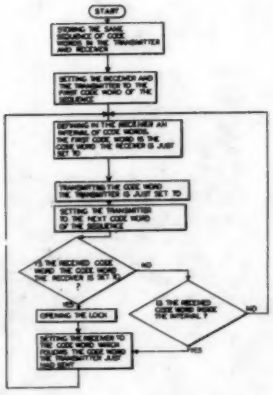
4,928,098
METHOD FOR CODE PROTECTION USING AN ELECTRONIC KEY

Friedrich Dannhaeuser, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 925,696, Oct. 29, 1986, abandoned, which is a continuation-in-part of Ser. No. 595,399, Mar. 30, 1984, abandoned. This application Oct. 27, 1988, Ser. No. 263,403

Int. Cl.[5] H04Q 3/02, 7/00

U.S. Cl. 340—825.56 1 Claim


START
STORING THE SAME SEQUENCE OF CODE WORDS IN THE TRANSMITTER AND RECEIVER
SETTING THE RECEIVER AND THE TRANSMITTER TO THE FIRST CODE WORD OF THE SEQUENCE
DEFINING IN THE RECEIVER AN INTERVAL OF CODE WORDS, THE FIRST CODE WORD IS THE CODE WORD THE RECEIVER IS JUST SET TO
TRANSMITTING THE CODE WORD THE TRANSMITTER IS JUST SET TO
SETTING THE TRANSMITTER TO THE NEXT CODE WORD OF THE SEQUENCE
IS THE RECEIVED CODE WORD THE CODE WORD THE RECEIVER IS SET TO?
NO
YES
OPENING THE LOCK
IS THE RECEIVED CODE WORD WITHIN THE INTERVAL?
NO
YES
SETTING THE RECEIVER TO THE CODE WORD WHICH FOLLOWS THE CODE WORD THE TRANSMITTER JUST HAS SENT

1. In a method of code protection of an electronic key system for operating a lock, of the type in which a code is transmitted from a transmitter to a receiver via an infrared signal, and in which the receiver responds to the receiver code to produce an unlocking signal for the lock, the improvement comprising the steps of:

determining an identical sequence of codes in the transmitter and in the receiver;

transmitting a code of the sequence from the transmitter to the receiver for an unlocking event;

setting the transmitter to the next code of the sequence following the transmitted code;

comparing, at the receiver, the received code with a code in which the receiver is set;

opening the lock of the received code matches the code to which the receiver is set;

stepping said receiver through an interval of codes following the code to which the receiver is set if the received code is other than the code to which the receiver is set by sequentially comparing said received code with the remaining codes following the code to which the receiver is set;

limiting the number of times said receiver is stepped through said interval in response to the reception of a code other than the one to which the receiver is set to a number of times less than the total number of codes in the sequence; and

setting the receiver to a code in the sequence following the code the transmitter just transmitted only if the received code is one of the codes in the interval.

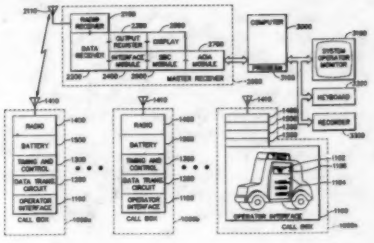
4,928,099
TELEMETRY SYSTEM FOR AUTOMATED REMOTE CALLING AND CENTRAL DISPATCH OF SERVICES, PARTICULARLY TAXICABS

Donald L. Drake, 1500 Prater Way, Sparks, Nev. 89431

Filed Mar. 1, 1988, Ser. No. 162,697

Int. Cl.[5] G08B 1/08; H04M 11/04

U.S. Cl. 340—825.280 17 Claims



1. A telemetry system for remote registration of requests for services to a central dispatch of such services, the system comprising:

a plurality of call boxes each transmitting an individually unique digital code upon such times as services are requested, each call box including

a time delay means for timing a first predetermined time period after transmitting of the digital code during which first time period the transmitting of digital code is inhibited; and

a central station receiving the digital codes upon the times services are requested from the plurality of all boxes, and for digitally processing the codes to produce a display intelligible to a human to permit dispatching by said human of a requested service to a requesting call box location.

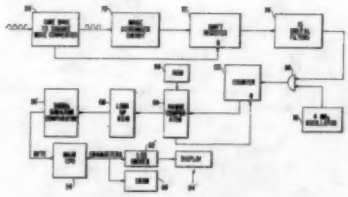
4,928,100
PAGING RECEIVER FOR RECEIVING PAGES FROM ANALOG OR DIGITAL PAGING TRANSMITTERS

Andrew A. Andros, Spring, Tex., and Thomas J. Campana, Chicago, Ill., assignors to Telefind Corporation, Coral Gables, Fla.

Filed Oct. 20, 1987, Ser. No. 110,512

Int. Cl.[5] H04Q 7/00; G08B 5/22

U.S. Cl. 340—825.440 34 Claims



1. A RF paging receiver for receiving pages transmitted from either a frequency modulation digital paging transmitter or from a frequency modulation analog paging transmitter in which characters of the page are transmitted by frequency modulation of a carrier with a plurality of frequencies being used to encode the characters with the carrier being frequency modulated by the plurality of frequencies comprising:

(a) means for receiving and discriminating the modulated

carrier into a signal having discrete frequencies with each frequency being one of the plurality of frequencies;

(b) amplifying means coupled to the means for receiving and discriminating for amplifying the signal to create a square wave having a period equal to a period of the sinusoidal signal;

(c) digital filtering means coupled to the amplifying means, having a plurality of distinct pass bands each centered around a different one of the plurality of frequencies, the digital filtering means outputting a square wave when the square wave period falls within one of the pass bands of the digital filtering means and blocking passage of all square waves falling outside the pas band of the digital filtering means;

(d) counting means, coupled to the digital filtering means, for converting each output of the digital filtering means into a number proportional to the period of the square wave passed by the digital filtering means; and

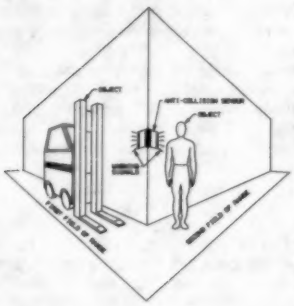
(e) character processing means, coupled to the counting means, for outputting characters each having an identity determined by the value of one or more numbers produced by the counting means.

4,928,101

ANTI-COLLISION SENSOR

Alexander L. Favors, 70 Creek Rd., Chalfont, Pa. 18914

Filed Aug. 15, 1989, Ser. No. 394,393
Int. Cl.[5] G08G *1/04*
U.S. Cl. 340—943 **11 Claims**



1. An ultrasonic anti-collision detection and warning system adapted to be attached to a corner for warning objects converging on an intersection from different directions comprising:

first ultrasonic detection means having a first ultrasonic emitter means which periodically emits an ultrasonic pulse at a first frequency within a first field of range, and a first ultrasonic sensor means which detects an echo of said ultrasonic pulse emitted at said first frequency;

second ultrasonic detection means having a second ultrasonic emitter means which periodically emits an ultrasonic pulse at a second frequency within a second field of range, and a second ultrasonic sensor means which detects an echo of said ultrasonic pulse emitted at said second frequency;

flexible connecting means for connecting said first and second ultrasonic detection means around said corner;

processor means for determining when an object enters said first field of range based upon the time an ultrasonic echo is received by said first sensor means off of said object, said processor means further determining when an object enters said second field of range based upon the time of an ultrasonic echo received by said second sensor means off of said object, said processor means outputting a signal when objects simultaneously enter said first and second fields of range; and

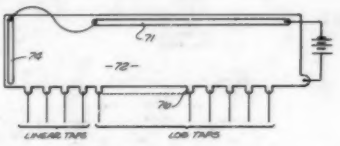
alarm means responsive to said signal for outputting a warning signal in said first and second fields of range when objects are simultaneously within said first and second fields of range.

4,928,102

FLASH ANALOG-TO-DIGITAL CONVERTER WITH LOGARITHMIC/LINEAR THRESHOLD VOLTAGES

Henry S. Katzenstein, Pacific Palisades, Calif., assignor to Brooktree Corporation, San Diego, Calif.

Filed Aug. 11, 1988, Ser. No. 231,100
Int. Cl.[5] H03M *1/36, 1/78;* H01C *10/04*
U.S. Cl. 341—154 **35 Claims**



1. In combination, a member provided with an electrically resistive material on one surface of the member, the member being defined by first and second side edges and top and bottom edges,

means for providing a reference voltage on the resistive material along the first side edge of the member,

means for providing an energizing voltage on the resistive material at the juncture between the top edge and the second side edge of the resistive material, and

means for obtaining an output voltage at progressive positions along the second side edge of the resistive material the progressive positions at the second side edges of the resistive material being substantially equally spaced to provide a logarithmic relationship in the voltage at the progressive position with respect to the positions of such successive terminals.

4,928,103

PARALLEL ANALOG-TO-DIGITAL CONVERTER USING $2^{(n-1)}$ COMPARATORS

Charles D. Lane, Greensboro, N.C., assignor to Analog Devices, Inc., Norwood, Mass.

Filed Sep. 18, 1989, Ser. No. 408,278
Int. Cl.[5] H03M *1/36*
U.S. Cl. 341—159 **6 Claims**

1. An analog-to digital flash converter for converting an analog signal to an n-bit digital signal, said converter comprising:

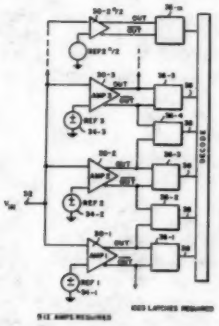
$2^n/2$ consecutive input comparators, each having a first input coupled to receive said analog signal,

means for producing $2^n/2$ reference voltages spaced apart by two LSBs of said converter and for providing one each of said $2^n/2$ reference voltages to a second input of each input comparator, each of said input comparators having first and second outputs, said first output generally being at a first voltage level when said analog signal is greater than the associated reference signal and at a second voltage level when said analog signal is less than the associated reference signal and said first output gradually transitioning from said first output voltage level to said second output voltage level where said analog signal and said associated reference signal are approximately equal, and said second output being the inverse of said first output, and

$2^n/2$ latch means, each associated with one of said input comparators and having first and second inputs for ac-

cepting said first and second outputs of said associated input comparator,

$(2^n/2)-1$ additional latch means, each additional latch means having a first input coupled to receive said first output of one of said input comparators and a second input coupled to receive said second output of an input comparator adjacent said one of said input comparators,



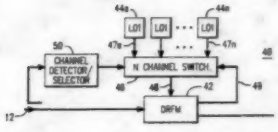
said latch means and additional latch means each having an output which is of a first latch output voltage when said first input thereto is less than said second input thereto and of a second latch output voltage when said first input thereto is greater than said second input thereto.

4,928,104

WIDEBAND MULTI-CHANNEL DIGITAL RADIO FREQUENCY MEMORY

Timothy J. Schaffer, Eldersburg, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 23, 1988, Ser. No. 288,850
Int. Cl.[5] G01S 7/38
U.S. Cl. 342—15 **9 Claims**



1. A digital radio frequency memory suitable for use as a coherent radio frequency memory in a military electronic countermeasure system, said memory comprising:

a plurality of RF local oscillators for producing local oscillator signals of different frequencies;

a first mixer for selectively converting an RF input signal and one of said local oscillator signals into an intermediate frequency signal within a selected instantaneous bandwidth;

an analog-to-digital (A/D) converter for converting the IF signal into digital values;

a digital memory for storing said digital values for later retrieval;

a digital-to-analog (D/A) converter for converting the retrieved digital values into an analog signal:

a second mixer for converting the analog signal and said selected local oscillator signal into an RF output signal which replicates the RF input signal;

a channel detector responsive to the frequency of the RF input signal for producing gate outputs for selected frequency ranges;

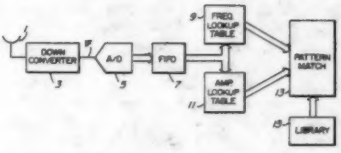
and a channel selector switch connected to the local oscillators and the channel detector for selecting a local oscillator in accordance with the gated output of the frequency detector, said channel detector causing the channel selector switch to select a different oscillator in accordance with a gated output when the instantaneous bandwidth of the DRFM would otherwise be exceeded.

4,928,105

INTRAPULSE RADAR RECEIVER

Paul Langner, Kanata, Canada, assignor to Telemus Electronic Systems, Inc., Ontario, Canada

Filed May 24, 1989, Ser. No. 356,200
Claims priority, application Canada, May 25, 1988, 567643
Int. Cl.[5] G01S 7/44; G01R 23/02
U.S. Cl. 342—192 **19 Claims**



1. An intrapulse microwave radar receiver, comprised of:

(a) first means for receiving and down-converting an incoming microwave signal and in response generating an intermediate analog signal,

(b) second means for receiving and digitizing said intermediate analog signal and in response generating a plurality of digital signal samples, and

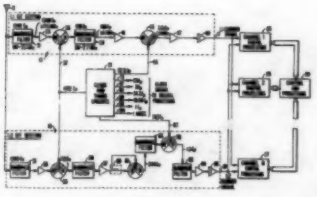
(c) third means for receiving said digital signal samples in groups of three, performing a three point best-fit sinusoidal approximation of said digital signal samples and in response generating further digital signals representative of the intrapulse frequency and amplitude of said incoming microwave signal with respect to time.

4,928,106

GLOBAL POSITIONING SYSTEM RECEIVER WITH IMPROVED RADIO FREQUENCY AND DIGITAL PROCESSING

Javad Ashjaee, San Jose; Roger J. Helkey, Goleta; Robert G. Lorenz, Palo Alto, and Robert A. Sutherland, Newark, all of Calif., assignors to Ashtech Telesis, Inc., Sunnyvale, Calif.

Filed Jul. 14, 1988, Ser. No. 219,353
Int. Cl.[5] H04B 7/185
U.S. Cl. 342—352 **15 Claims**



1. In a global positioning system receiver having a radio frequency section adapted for receiving from an antenna a L1 radio frequency signal having a nominal carrier frequency of $1540f_0$, where $f_0=1.023$ MHz., and for delivering an intermediate frequency signal to a digital section that processes the

intermediate frequency signal in a manner to extract desired phase information therefrom, an improved receiver section, comprising:

a first radio frequency stage connectable to said antenna and having an output,

a first mixer receiving said first radio frequency stage output and responsive to a first local oscillator signal for reducing a signal output of the first radio frequency stage to a first intermediate frequency signal,

a second radio frequency stage receiving the first intermediate frequency signal and having an output,

a second mixer receiving the second radio frequency stage output and responsive to a second local oscillator signal for reducing the first intermediate frequency signal to a second intermediate frequency signal,

a third radio frequency stage connecting said second intermediate frequency signal to an input of said digital section, and

means responsive to a common precise reference oscillator for generating said first and second local oscillator signals and clock signals for said digital section that are all mutually coherent with each other, said reference oscillator having a frequency of substantially $20f_0$, said first local oscillator signal being substantially $1372f_0$, wherein said first intermediate frequency signal is substantially $168f_0$, and said second local oscillator signal being substantially $171.5f_0$, wherein said second intermediate frequency signal is substantially $3.5f_0$, whereby said digital processing section can be easily process said second intermediate frequency signal.

4,928,107

SIGNAL RECEIVING METHOD FOR A USER'S DEVICE IN A GLOBAL POSITIONING SYSTEM

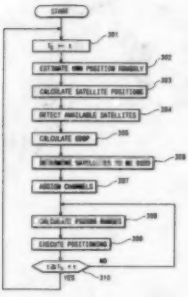
Hiroshi Kuroda, and Atsushi Watanabe, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering Co., Ltd., Ibaraki, both of, Japan

Filed Jun. 19, 1989, Ser. No. 367,665

Claims priority, application Japan, Jun. 22, 1988, 63-152215

Int. Cl.[5] G01S *5/02*; H04B *7/185*; G01C *21/00*

U.S. Cl. 342—357 **14 Claims**



1. A signal receiving method in a user's device of a global positioning system (GPS), which has a receiver with plural channels capable of simultaneously receiving signals from plural satellites to be used for the positioning and a microprocessor for executing a predetermined processing for the positioning on the basis of the received satellite signals to thereby determine a precise position of a user, comprising:

step of detecting satellites available to the user from among GPS satellites on the basis of the relationship of positions of the GPS satellites and a roughly estimated position of the user;

step of calculating values of geometric dilution of precision (GDOP) with respect to every combination of satellites; each combination of satellites including plural satellites selected from among the available satellites detected, a number of which depends on the required dimension of the positioning; and

step of determining satellites included in one of the combinations of satellites, which has a GDOP value smaller than a desired value, as the satellites to be used for the positioning,

characterized by

step of setting a present time with a predetermined operation period to periodically initiate said detecting step; and

step of repeatedly executing the processing for the positioning on the basis of the signals from the satellites determined in said determining step through one operation period.

4,928,108

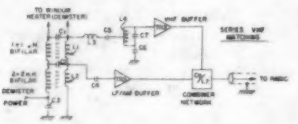
ELECTRICAL SIGNAL SEPARATING DEVICE HAVING ISOLATING AND MATCHING CIRCUITRY FOR SPLIT PASSBAND MATCHING

Jerzy J. Kropielnicki, Knutsford; Brian Easter, Llangernyl, and James D. Last, Llanfairfechan, all of United Kingdom, assignors to BSH Electronics, Ltd., Manchester, United Kingdom

Continuation of Ser. No. 27,520, Mar. 18, 1987, abandoned, which is a division of Ser. No. 563,513, Dec. 20, 1983, Pat. No. 4,654,669. This application Mar. 7, 1989, Ser. No. 319,738

Int. Cl.[5] H01Q *1/02, 1/32*

U.S. Cl. 343—704 **8 Claims**

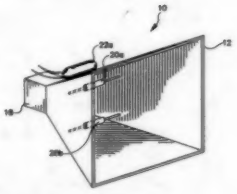


1. An isolating and matching device to enable the heating element of a motor vehicle electrically heatable window, not designed specifically to be an antenna or aerial and essentially aperiodic and non-resonant at VHF frequencies, to be used as a VHF transmitting and/or receiving aerial, said device being interconnected between terminal leads of said heating element and an aerial feeder circuit of a VHF two-way communications transmit/receive unit, and having an input lead for connection to a motor vehicle D.C. power supply and an aerial terminal for connection to said aerial feeder circuit, comprising in combination: isolating circuit means coupled in parallel with said terminal leads of said heating element and with said motor vehicle D.C. power supply to permit passage of heating current from said power supply to the said heating element while isolating or blocking passage of RF signals from said heating element to the said power supply, said isolating circuit means including inductor means to bring the said heating element to parallel resonance near the center of the VHF band, and matching circuitry means connected between the said terminal leads of said heating element and said aerial feeder circuit, for effectively matching the impedance of said heating element to an aerial input impedance of the said aerial feeder circuit, said matching circuitry means including circuit means for providing two VHF passbands, one centered on a predetermined VHF transmit frequency and the other centered on a predetermined VHF receive frequency; whereby, via said isolating and matching device, said motor vehicle electrically heatable window becomes usable as an efficient VHF transmitting and/or receiving aerial.

4,928,109
MODULATED SCANNING ANTENNA

Mark E. Bonebright, La Mesa; Paul R. Eberhardt, Encinitas, and John C. Alley, San Diego, all of Calif., assignors to Cubic Defense Systems, Inc., San Diego, Calif.

Filed Oct. 14, 1988, Ser. No. 257,691
Int. Cl.[5] H01G 13/02
U.S. Cl. 343—786 10 Claims



1. A scanning antenna, comprising:

a receiver element for detecting signals in the form of interacting with electromagentic radiation at predetermined frequencies;

an antenna horn for capturing and coupling said electromagnetic radiation to said receiver element, said horn comprising non-magnetic electrical conductive material and having a centerline of focus;

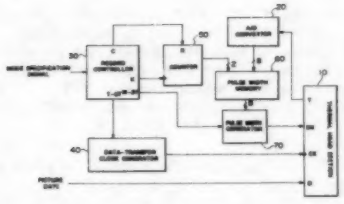
magnetically switchable electrical conductor means extending between interior sides of said horn spaced apart from and substantially perpendicular to said centerline, said conductor means being magnetically switchable between discrete electrically conductive on and non-conductive off states; and

magnetic field emission means positioned adjacent a sidewall of said horn for generating a magnetic field having a strength at said conductor means sufficient to switch said conductor means between said two discrete states.

4,928,110
THERMAL RECORDING CONTROL METHOD AND SYSTEM

Nobuhiro Inoue, Hachioji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 31, 1988, Ser. No. 238,444
Claims priority, application Japan, Sep. 1, 1987, 62-218467
Int. Cl.[5] G01D 9/00
U.S. Cl. 346—1.1 4 Claims



1. A thermal recording control system comprising:

a thermal head having a plurality of heaters arranged in a line across a feed direction of a recording paper, said plurality of heaters corresponding to a line of picture data;

register means for storing a plurality of data corresponding to said line of picture data, each of the plurality of data corresponding to a respective one of the plurality of heaters, and outputting the plurality of data to the thermal head in a parallel manner;

counter means;

first control means for incrementing the value of the counter means from an initial value each time said stored plurality of data are recorded on a recording paper;

means for setting a time period for activating a respective heater of the thermal head to record the stored corresponding data on the recording paper in response to the value of said counter means, the length of said activation time period being decreased as the counter value is increased;

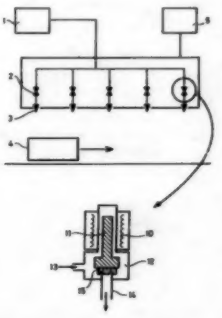
means for activating the respective heater in response to said register means during the set activation time period; and

second control means for setting the counter means to the initial value when the stored plurality of data are repetitively recorded on the recording paper a predetermined number of times so that a subsequent line of picture data can be recorded on the recording paper.

4,928,111
METHOD FOR OPERATING A VALVE

Robert L. Walton, Rushden, England, assignor to Willett International Limited, Bucks, England

Filed Apr. 3, 1989, Ser. No. 331,840
Claims priority, application United Kingdom, Dec. 1, 1988, 8828046
Int. Cl.[5] G01D 9/00
U.S. Cl. 346—1.1 8 Claims



1. A method for operating an electromagnetic valve means comprising a valve plunger journalled within a valve body for movement under the influence of an electric current on a drive stroke from a valve closed position to a valve open position, which valve means controls the flow of fluid to a nozzle orifice in a non-contact fluid droplet applicator apparatus, which method comprises intermittently applying a transient drive current to the valve means which is insufficient to move the plunger sufficiently on its drive stroke towards the valve open position to permit the flow of fluid through the valve.

4,928,112
INK CURING APPARATUS

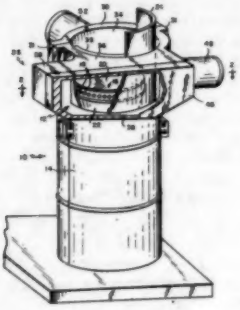
Allan G. Hock, Londonderry; John R. Larson, Hamstead, and John G. Sousa, Nashua, all of N.H., assignors to Howtek, Inc., Hudson, N.H.

Filed Mar. 23, 1987, Ser. No. 28,924
Int. Cl.[5] G01D 15/16; B41J 3/04
U.S. Cl. 346—25 13 Claims

1. An ink curing apparatus for an ink jet printer having at least one ink jetter through which ink is discharged onto an adjacent paper sheet having top, bottom and side edges, said apparatus comprising:

(A) a shell over the portion of the printer where said ink jetter is located, said shell having a shell wall spaced from said ink jetter and said sheet so as to form a cavity between said sheet and the shell wall that extends between the side edges of the sheet;

(B) a plurality of openings extending from the exterior of



said shell into said cavity, at least two of said openings being located adjacent to the side edges of said sheet; and

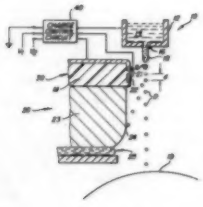
(C) air moving means coupled to at least one of said plurality of openings into said cavity for moving air through said at least one opening so as to produce a flow of air between the side edges of the sheet that flows over and generally parallel to a surface of said sheet.

4,928,113

CONSTRUCTIONS AND FABRICATION METHODS FOR DROP CHARGE/DEFLECTION IN CONTINUOUS INK JET PRINTER

Margene C. Howell, Dayton; James A. Katerberg, Kettering; David N. Pipkorn, Centerville, and Wendell L. Wood, Dayton, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,737
Int. Cl.[5] G01D *15/18*
U.S. Cl. 346—75 **12 Claims**



1. In continuous ink jet printing apparatus, an improved print head construction comprising:

(a) means for directing a plurality of ink streams through a drop charge region toward a print zone;

(b) charging means including charge electrodes located adjacent said drop charge region and means for selectively applying an information voltage to said charge electrodes;

(c) deflection means including a deflection electrode(s) spaced downstream from said charge electrodes by about one nominal drop spacing or less and means for applying a deflection voltage to said deflection electrode; and

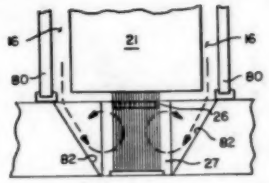
(d) dielectric matrix means for integrally embedding said charge and deflection electrodes in said closely spaced relation.

4,928,114

AIR SKIVING SYSTEM FOR INK JET PRINTER START-UP

Randy L. Fagerquist; Wendell L. Wood, and Frank W. Atkins, all of Dayton, Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,101
Int. Cl.[5] G01D *15/18*
U.S. Cl. 346—75 **2 Claims**



1. In continuous ink jet printer apparatus of the kind having drop generator means for directing droplet streams toward a print zone, drop charging means for inducing electrical charge selectively on droplets of such streams, catcher means for intercepting selected droplets and returning them to an ink supply and print head housing means for enclosing the drop charging and catcher means within a print head chamber having a printing egress, an improved system for air skiving said drop charging and catcher means comprising:

(a) means for defining an air inlet opening in said housing proximate said drop charging means;

(b) air filter means located in said air inlet opening to filter air passing through said opening into said housing;

(c) housing closure means for selectively opening and closing said printing egress;

(d) actuatable vacuum means for creating a negative pressure region within said chamber at a location proximate said catcher means; and

(e) control means for effecting an air skive sequence by effecting closing of said housing closure means and subsequent actuation of said vacuum means;

whereby high velocity airflow is induced to flow through said air filter means and skive over surfaces of said charging and catcher means during passage to said negative pressure region.

4,928,115

CONTINUOUS INK JET PRINTER HAVING REMOTELY OPERABLE PRINT HEAD ASSEMBLY

Randy L. Fagerquist; Wendall L. Wood; Frank W. Atkins, Dayton, and Surinder K. Bahl, Beavercreek, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,102
Int. Cl.[5] G01D *15/18*
U.S. Cl. 346—75 **2 Claims**

1. A continuous ink jet printer system having a remote printing capability, said system comprising:

(a) a mainframe subsystem including an ink supply reservoir, ink recirculating means, a power supply and data handling and machine control means, including phase adjustment means;

(b) a remotely operable, continuous ink jet print head assembly including:

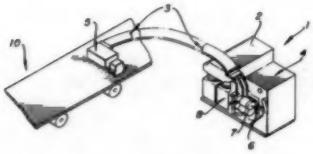
(i) upper print head means for generating a plurality of continuous droplet streams;

(ii) drop charge means, including a plurality of drop

charge electrodes, for selectively charging droplets of said streams; and

(iii) droplet catcher means including an electrically conductive catcher pan, a catcher ink egress and a dielectric drop impact surface separating said catcher pan and said drop charge means;

(iv) housing means for supporting and defining an enclosure chamber around said upper head means and drop charge means and said catcher means, said housing including movable lower wall means for selectively opening and closing a printing egress for selectively



opening and closing a printing egress for said drop streams; and

(c) fluid and electrical umbilical means for coupling said mainframe subsystem and said remote print head assembly, including:

(i) conduit means coupling said upper print head to said ink supply reservoir and said catcher ink egress to said recirculation means; and

(ii) electrical lines coupling said drop charge means to said power supply and said catcher pan to said machine control means for phase adjustment operations.

4,928,116

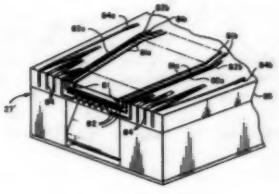
INK JET PRINTER HAVING IMPROVED PRINT HEAD HEATER CONSTRUCTION

Wendell L. Wood, Dayton, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,739

Int. Cl.[5] G01D *15/18*

U.S. Cl. 346—75 **7 Claims**



1. In continuous ink jet printing apparatus of the kind having means for directing a plurality of ink streams through a drop charge region toward a print zone an improved lower print head construction comprising:

(a) a support block having a lead support surface and an orthogonal electrode support surface located adjacent said drop charge region;

(b) charging means, including charge electrode portions on said electrode support surface and lead portions on said lead support surface, for discretely imparting information charge to said drop streams; and

(c) resistive heater means including resistive element portions located on said block surfaces in closely spaced relation to said charge electrodes and lead portions;

said support block comprising a dielectric matrix integrally embedding said charging and heating means in said closely spaced relation.

4,928,117

THERMAL PRINTOUT DENSITY CONTROL

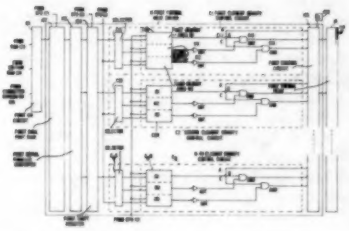
Toshiyuki Takeuchi, Chigasaki, Japan, assignor to Graphtec Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 14, 1988, Ser. No. 257,983

Claims priority, application Japan, Oct. 17, 1987, 62-262345

Int. Cl.[5] G01D *15/10*

U.S. Cl. 346—76 PH **5 Claims**



5. In apparatus for recording data with a thermal recording head including a plurality of clocked heating elements,

the improvement comprising in combination:

memory areas for distinctly storing recording data, including three memory areas for each heating element;

means for sequentially applying to each of said three memory areas a present moment recording datum, a one-clock-interval-old recording datum, and a two-clock-interval-old recording datum, respectively, for the particular heating element;

a first inverter having an input connected to the memory area storing said one-clock-interval-old recording datum;

a second inverter having an input connected to the memory area storing said two-clock-interval-old recording datum;

a first AND element having a first input connected to the memory area storing said present moment recording datum and its second input connected to an output of said first inverter;

a second AND element having a first input also connected to the memory area storing said present moment recording datum and its second input connected to an output of said second inverter; and

means connected to the memory area storing said present moment recording datum and to outputs of said first and second AND elements for sequentially energizing the particular heating element pursuant to said present moment recording datum, and with an output of said first AND element and an output of said second AND element.

4,928,118

ENHANCED RESOLUTION ELECTROPHOTOGRAPHIC-TYPE IMAGING STATION

David Leksell, Oakmont; Zoltan K. Kun, Churchill Boro, and Alan F. Mandel, Mt. Lebanon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 7, 1988, Ser. No. 281,111

Int. Cl.[5] G01D *15/14*

U.S. Cl. 346—107 R **15 Claims**

1. An electrophotographic-type imaging station for producing an informational array pattern of enhanced resolution on the surface of a photosensitive medium, comprising:

a photosensitive medium having a mutually orthogonal first and second axes;

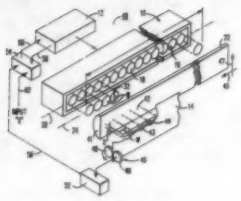
light radiation means spaced from said photosensitive medium, said light radiation means being capable of projecting a preselected number of beams of light energy along

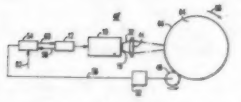
generally linear paths defining a row substantially parallel with said medium first axis, each projected beam having a preselected cross-sectional configuration with mutually orthogonal first and second cross-sectional axes;

said light radiation means being capable of projecting each said beam of light energy in a direction towards an individually addressable location on said medium so that each said beam first and second cross-sectional axes are substantially parallel with said medium first and second axes, respectively;

focusing means interposed between said photosensitive medium and said light radiation means, said focusing means focusing each said preselected cross-section beam projected along said row and towards an individually addressable location on said photosensitive medium to a generally rectangular beam of light energy;

each said rectangular beam having a first cross-sectional axis substantially identical in length to the length of said first cross-sectional axis of said projected beam and a second cross-sectional axis reduced as a selected percentage of the length of said projected beam second cross-sectional axis, said rectangular beam first cross-sectional axis being greater in length than said rectangular beam second cross-sectional axis;





means for moving said photosensitive medium relative to said light radiation means in a direction substantially parallel with said medium second axis;

means for coordinating the activation of said light radiation means and said means for moving said photosensitive medium so that an informational array pattern formed from a plurality of rows of generally rectangular beams is focused in row-at-a-time, abutting fashion onto said photosensitive medium;

said informational array pattern forming an N×M matrix wherein the value N corresponds to the total number of said individually addressable locations in a preselected length of a given row onto which said rectangular beams of light energy may be projected, and the value M corresponds to the total number of rows of rectangular beams of light energy capable of being projected over the same preselected length measured in a direction parallel with said medium second axis;

the value N defining the resolution of said informational array pattern in a direction parallel with said medium first axis and the value M defining the resolution of said informational array pattern in a direction parallel with said medium second axis; and

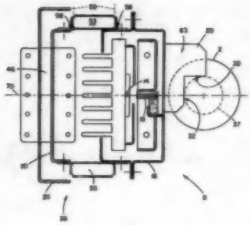
said resolution in said direction parallel with said medium second axis being greater than said resolution in said direction parallel with said medium first axis.

4,928,119

MOUNT FOR LINEAR ASSEMBLY

Jimmy P. Walker, Rochester, and James T. Barton, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 2, 1988, Ser. No. 239,886
Int. Cl.[5] G01D *15/14*
U.S. Cl. 346—108 **31 Claims**



1. A mount for maintaining a printhead assembly in operative relation to a rotary component having a primary axis, despite angular displacement of the primary axis of the rotary component about x and y axes generally orthogonal to the primary axis and each other, the printhead assembly being of the type projecting a predominantly linear image on a surface moving past the printhead assembly while the surface is supported by the rotary component, said mount comprising:

means fixed to the printhead assembly for separably contacting the rotary component and restricting movement of the printhead assembly about the x and y axes relative to the rotary component, but permitting such movement of the printhead assembly with the rotary component, and

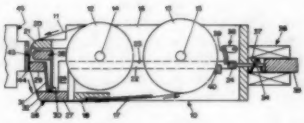
means supporting the printhead assembly, for resiliently urging the contacting means into contact with the rotary component, and for preventing angular movement of the printhead assembly about the primary axis while permitting angular movement of the printhead assembly about the x and y axes with the rotary component.

4,928,120

ORIFICE PLATE CLEANER FOR HOT MELT INK JET

Charles W. Spehrley, Jr., Hartford; Steven H. Barss, Norwich; David G. Tomaszewski, Sharon, and Paul A. Hoisington, Thetford Center, all of Vt., assignors to Spectra, Inc., Hanover, N.H.

Filed Nov. 21, 1988, Ser. No. 275,096
Int. Cl.[5] B41J *2/165*
U.S. Cl. 346—140 R **20 Claims**



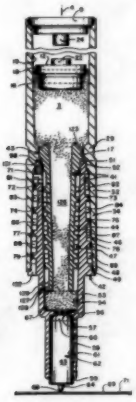
1. Apparatus for cleaning an orifice plate in a hot melt ink jet head comprising web means supported for motion toward an orifice plate of a hot melt ink jet head, movably supported pressure bar means for engaging the web means and urging the web means against the orifice plate, and means for moving the pressure bar means toward the orifice plate to urge the bar means against the web means with a selected force.

4,928,121

UNIVERSAL PLOTTER PEN HAVING IMPROVED MARKING FLUID FLOW CHARACTERISTICS

Jerald C. Rasbaugh, San Jose, Calif., assignor to Summer & Taylor, Inc., San Jose, Calif.

Filed Nov. 16, 1988, Ser. No. 271,910
Int. Cl.[5] G01D *15/16*; B43K *23/02, 5/14*
U.S. Cl. 346—140 R **40 Claims**



16. A universal plotter pen having improved marking fluid flow characteristics, comprising:

(a) a cartridge having tubular walls closed at one end and open at the other end and having a seal ring therewithin intermediate the closed and open ends and a cavity therewithin constituting a reservoir for marking fluid and defined between the seal ring and said closed end;

(b) a delivery system for marking fluid mounted in the open end of said cartridge in sealing engagement with said seal ring and including an elongated unobstructed passageway extending axially therethrough and communicating with said cavity constituting said marking fluid reservoir, whereby marking fluid may flow unobstructed from said reservoir through said passageway;

(c) an auxiliary reservoir cavity for marking fluid within said delivery system and communicating with said axially extending unobstructed passageway to receive marking fluid therefrom;

(d) a plotting point mounted on said marking fluid delivery system in communication with said auxiliary reservoir cavity, whereby marking fluid deposited by said plotting point is drawn from said auxiliary reservoir; and

(e) said tubular cartridge is provided with a thickened annular wall portion intermediate said open and closed ends.

4,928,122

EXPOSURE HEAD

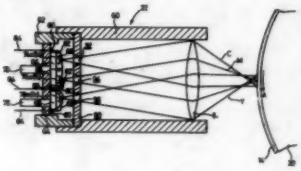
Atsuhiro Doi, and Tomonori Nishio, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 23, 1989, Ser. No. 299,578
Claims priority, application Japan, Jan. 21, 1988, 63-12361; Apr. 19, 1988, 63-96138; Apr. 19, 1988, 63-96139; Apr. 19, 1988, 63-96140
Int. Cl.[5] G01D *15/00*
U.S. Cl. 346—160 **10 Claims**

1. An exposure head for scanning a photosensitive medium with light beams modulated by image information in a main scanning direction while the photosensitive medium and the light beams are being relatively moved in an auxiliary direction transverse to the main scanning direction, to record a two-dimensional image on the photosensitive medium, comprising:

a light source for emitting the light beams; and

an aperture member disposed between said light source and the photosensitive medium and having a plurality of apertures defined therein for passing the light beams respectively therethrough, each of said apertures being shorter in said main scanning direction and longer in said auxiliary scanning direction.

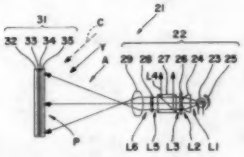


4,928,123

PROJECTION TYPE LIQUID CRYSTAL DISPLAY DEVICE

Yutaka Takafuji, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 15, 1988, Ser. No. 206,759
Claims priority, application Japan, Jun. 16, 1987, 62-150391
Int. Cl.[5] G03B *21/14*
U.S. Cl. 353—20 **7 Claims**



1. A liquid crystal display device comprising:

a display screen; and

a projector for projecting an image on said display screen;

said projector including,

a light source developing a light beam,

a polarizing beam splitter polarizing said light beam in a first polarizing direction,

a liquid crystal display modulating said light beam polarized by said polarizing beam splitter to form the image to be projected;

said display screen including,

polarizing means for polarizing said image projected by said projector, said polarizing means being arranged orthogonally to the first polarizing direction of said light beam polarized by said polarizing beam splitter, and

a lenticulated sheet lenticulated orthogonally to said polarizing means for preventing scattering of light in a vertical direction of the display screen.

4,928,124
PHOTOGRAPHIC CAMERA

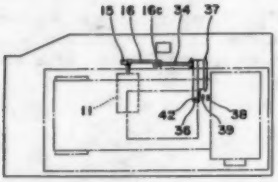
Nobuyuki Taniguchi, Nishinomiya; Takeo Hoda, Kawachinagano; Yoshiaki Hata, Nishinomiya; Manabu Inoue, Kobe; Yoshinobu Kudo, Sakai, and Hiroshi Ueda, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 348,075, May 5, 1989, Continuation of Ser. No. 939,706, Dec. 9, 1986, abandoned. This application Aug. 17, 1989, Ser. No. 395,039

Claims priority, application Japan, Dec. 9, 1985, 60-277584; Dec. 10, 1985, 60-278586; Dec. 20, 1985, 60-288366

Int. Cl.[5] G03B *3/00, 17/24*

U.S. Cl. 354—106 **10 Claims**



1. A photographic camera having a real focal length photographing mode in which a normal range in a frame of a film will be printed on the photographing paper and a pseudo focal length photographing mode in which a range smaller than the normal range in a frame of the film will be printed on a photographic paper, said photographic camera comprising:

a mode selecting means for selecting one of said real focal length photographing mode and said pseudo focal length photographing mode;

means for winding the film by an identical length for every shot regardless of the selection of the photographing mode by said selecting means; and

a light shielding means for shielding at least a portion of the normal range in a frame of the film in the case where said pseudo focal length photographing mode was selected, said portion being limited to a portion of said film which is not to be utilized upon printing.

4,928,125
LIQUID DROP EJECTION APPARATUS USING A MAGNETIC FLUID

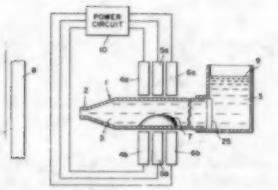
Iino Shuji, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 23, 1988, Ser. No. 248,391

Claims priority, application Japan, Sep. 24, 1987, 62-240467; Sep. 24, 1987, 62-240468; Sep. 24, 1987, 62-240469; Sep. 24, 1987, 62-240470

Int. Cl.[5] G01D *15/16;* **B41J** *3/04*

U.S. Cl. 346—140 R **8 Claims**



1. A liquid-drop ejection apparatus for supplying ink from a storage device to a nozzle and ejecting said ink in the form of drops, comprising:

a flow passage in said nozzle;

a magnetic fluid contained, adjacent to said ink, in said flow passage, and

means for ejecting said ink from a discharge opening, said ejecting means including:

means for deforming the magnetic fluid by applying a magnetic force from outside the flow passage, and

means for moving the deformed magnetic fluid along the flow passage in order to eject said ink from the discharge opening.

4,928,126
INK CONTAINER WITH DUAL-MEMBER SEALING CLOSURE

Naohito Asai, 30-2, 3-chome, Shimomaruko, Ohta-ku, Tokyo, Japan

Continuation of Ser. No. 57,740, Jun. 3, 1987, abandoned, which is a continuation of Ser. No. 693,172, Jan. 22, 1985, abandoned. This application Apr. 3, 1989, Ser. No. 332,386

Claims priority, application Japan, Feb. 9, 1984, 59-20849

Int. Cl.[5] G01D *15/16;* **B41J** *3/04*

U.S. Cl. 346—140 R **8 Claims**

1. An ink cartridge for an ink jet recording apparatus comprising:

a flexible ink bladder for storing ink therein;

a case containing said ink bladder;

an outlet pipe having an outlet port for directing the ink in said ink bladder outwardly thereof; and

a sealing closure member fitted into said case and sealing said outlet port, said closure member comprising:

a first elastic member of low gas permeability selected from the group of materials consisting essentially of butyl rubber, polychloroprene rubber, nitrile rubber, isobutylene rubber and polysulfide rubber, and

a second elastic member, with a compression permanent set lower than said first elastic member, selected from the group of materials consisting essentially of silicon rubber, urethane rubber, polyethylene chloride, eipchlorohydrin rubber, nitrile rubber (N13R), isoprene rubber, butadiene rubber, chloroprene rubber and fluororubber,

wherein said first elastic member and said second elastic member are disposed in that order from said outlet port.

4,928,127
SHEET CIRCULATION IN A DUPLEX PRINTER

Denis J. Stemmle, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 30, 1989, Ser. No. 357,926

Int. Cl.[5] G03G *15/00*

U.S. Cl. 346—160 **8 Claims**

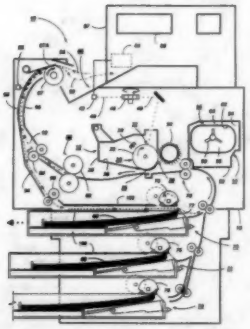
1. In a duplex printer or copier with a copy sheet output path, and a connecting duplexing path for returning copy sheets to be imaged on their opposite sides to make duplex copies, said duplexing path including a copy sheet inverting system with reversible copy sheet output path rollers to alternatively advance copy sheets, or with reversal, to transport copy sheets into said duplex path, the improvement comprising:

output path roller nip means for feeding copy sheets therefrom downstream through said copy sheet output path to said reversible copy sheet output path rollers.

copy sheet guide path means extending between, and providing a copy sheet guide path between, said output path roller nip means and said reversible copy sheet output path rollers,

said copy sheet guide path comprising a portion of said copy sheet output path and an initial portion of said duplexing path, and having a copy sheet guide path length between said output path roller nip means and said reversible copy sheet output path rollers which is a substantial portion of the dimension of the copy sheet being fed but substantially less than said copy sheet dimension so that a substantial portion of the copy sheet is extendable through and downstream of said reversible copy sheet output path rollers before the copy sheet is released by said output path roller nipmeans,

so that a subsequent copy sheet may be fed downstream in said copy sheet guide path by said output path roller nip means towards said reversible copy sheet output path



rollers simultaneously with, for a substantial time period with, the reverse feeding of the preceding copy sheet by said reversible copy sheet output path rollers into said duplex path,

and duplexing path transport means in said duplexing path for acquiring and feeding in said duplexing path copy sheets being reversibly driven by said reversible copy sheet output path rollers,

said duplexing path transport means being mounted in said duplexing path to have a copy sheet guide path length between said duplexing path transport means and said reversible copy sheet output path rollers which is substantially greater than said copy sheet guide path length between said output path roller nip means and said reversible copy sheet output path rollers.

4,928,128

SHEET CIRCULATION IN A DUPLEX PRINTER

Denis J. Stemmle, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 30, 1989, Ser. No. 359,064

Int. Cl.[5] G03G *15/00*

U.S. Cl. 346—160 **6 Claims**

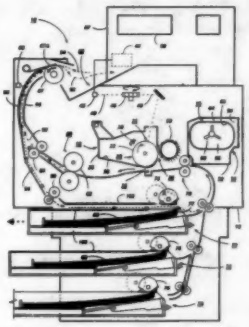
1. In a duplex printer or copier with a copy sheet output path, and a connecting duplexing path for returning copy sheets therein to be imaged on their opposite sides to make duplex copies, the improvement wherein:

said duplex printer or copier has at least one removable cassette copy sheet tray insertable into an opening in said duplex printer or copier, said cassette copy sheet tray normally providing for loading copy sheets into the printer,

said cassette copy sheet tray having a top cover member adapted to provide a lower guide member for a substantial portion of said duplexing path for guiding copy sheets in said duplexing path over the top of said cassette copy sheet tray without restacking therein,

and wherein said duplex printer or copier has a fixed baffle arrangement therein positioned to overly said top cover member of said cassette copy sheet tray when said cassette copy sheet tray is inserted into said duplex printer or copier to provide a mating upper guide member for a substantial portion of said duplexing path,

so that when said cassette copy sheet tray is inserted into said duplex printer or copier a copy sheet being duplexed is



guided between said fixed baffle arrangement and said top cover member of said cassette copy sheet tray to continue on past said cassette copy sheet tray in said duplexing path, but when said cassette copy sheet tray is removed, said substantial portion of said duplexing path is opened and exposed for recovering copy sheets therefrom.

4,928,129

PRINTING APPARATUS

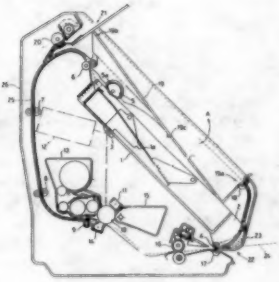
Iwakazu Honda, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 25, 1989, Ser. No. 343,197

Claims priority, application Japan, Apr. 30, 1988, 63-59128[U]; May 13, 1988, 63-117470; May 13, 1988, 63-63883[U]; May 13, 1988, 63-63884[U]; May 31, 1988, 63-73064[U]; May 31, 1988, 63-73065[U]; Jun. 15, 1988, 63-79102[U]

Int. Cl.[5] G01D *15/00*

U.S. Cl. 346—160 **12 Claims**



1. A printing apparatus comprising: a housing in which an electrostatic image forming means is disposed, said image forming means including a light-emitting section for irradiating a photosensitive means to form a latent image and a developing process section for developing the latent image into a real image with toner,

a paper receiving member disposed within the housing for receiving printed copy sheets,

a paper cassette for holding copy sheets to be printed, disposed on the back of the paper receiving member so that the copy sheets are covered with the paper receiving member, and

a paper conveyer disposed below the paper cassette for transporting copy sheets from the paper cassette to the paper receiving member, said image forming means being placed between the paper cassette and the paper conveyer so that the toner image is transferred onto a copy sheet passing through the paper conveyer.

4,928,130

STAGGERED ARRANGEMENT FOR IMPROVING RADAR REFLECTION

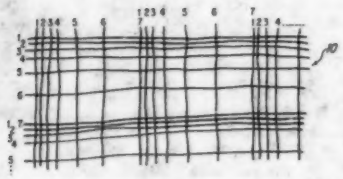
Peter Pfabe, and Hubert Nöhren, both of Hamburg, Fed. Rep. of Germany, assignors to Autoflug GmbH, Rellingen, Fed. Rep. of Germany

Continuation of Ser. No. 781,114, Sep. 27, 1985, abandoned. This application Jun. 14, 1989, Ser. No. 368,895

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1984, 3436063

Int. Cl.[5] F41J *9/10*

U.S. Cl. 342—9 **20 Claims**



1. In a staggered arrangement including towed aerial targets and multi-dimensional bodies where radar reflection is to be improved and on which staggered individual elements can be disposed that are made of conductive material and are spaced from one another; said elements being staggered for better radar reflection in a range between a lower cutoff frequency of a selected frequency band and an upper cutoff frequency of said selected frequency band having a predetermined wavelength of lower and upper cutoff frequencies respectively and being disposed on an object which is to be detected by a search frequency band of a radar unit;

the improvement in combination therewith comprising selecting said selected frequency band based upon a mathematically regulated variable spacing between said staggered individual elements ranging from a maximum spacing to a minimum spacing rather than constant spacing, said mathematically regulated variable spacing being based on a predetermined geometric progression involving said spacing between said staggered individual elements and said wavelength of said upper and lower cutoff frequencies of said selected frequency band wherein the distance between individual ones of said staggered individual elements at said maximum spacing starts at one half of the wavelength of the lower cutoff frequency and decreases in accordance with said predetermined geometric progression to one half of the wavelength of said upper cutoff frequency so that automatic gain of reflection results in said search frequency band of the radar unit which as a whole leads to an overall additive amplification of radar reflection according to mathematical regulation.

4,928,131

SEA CLUTTER SUPPRESSION RADAR

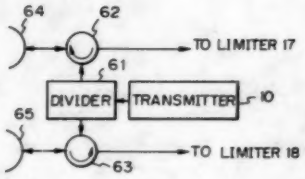
Kazuo Onozawa, Tokyo, Japan, assignor to Oki Electric Industry Co., Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,236

Claims priority, application Japan, Sep. 17, 1987, 62-232965

Int. Cl.[5] G01S *13/50*

U.S. Cl. 342—188 **4 Claims**



1. Sea clutter suppression radar comprising:

(a) at least one antenna for simultaneously sending horizontally and vertically polarized RF waves;

(b) first and second detectors for respectively detecting IF signals of horizontally and vertically polarized components of reflected RF waves and for providing outputs corresponding thereto;

(c) third and fourth detectors for respectively detecting IF signals of the vector sum and vector difference between said horizontally and vertically polarized components and for providing outputs corresponding thereto;

(d) a first subtracter for subtracting an absolute value of a difference between said outputs from said first and second detectors, from a sum of said outputs from said first and second detectors;

(e) a second subtracter for subtracting said output from said fourth detector, from said output from said third detector;

(f) a polarity signal generator for generating an output which is a binary signal according to a selected logic combination of results of a plurality of comparisons between: (1) each of a plurality of voltages proportional to a fraction of said output of said first subtracter and a plurality of voltages proportional to a fraction of an inverted output of said first subtracter and: (2) said output from said second subtracter;

(g) a first means for providing an output equal to an absolute value of a difference between said outputs of said first and second detectors;

(h) a third subtracter for providing an output equal to a difference between said output of said first means and said output of said third detector;

(i) a fourth subtracter for providing an output equal to a difference between said output of said first means and said output of said fourth detector;

(j) an adder for adding said outputs of said third and fourth subtracters; and

(k) a polarity conversion circuit for selectively converting a polarity of an output from said adder in accordance with said output from said polarity signal generator.

4,928,132
OPTICAL DATA STORAGE MEDIUM

Robert M. Pettigrew, Foxton; Victor C. Humberstone, Stapleford; Keith Gardner, Trumpington; Robert J. Longman, Coton, and Peter R. Helfet, London, all of Great Britain, assignors to Plasmon Data Systems, San Jose, Calif.

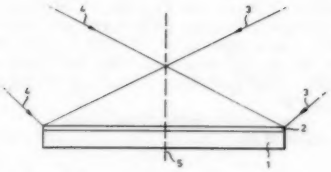
Continuation of Ser. No. 915,619, Oct. 6, 1986, Pat. No. 4,724,444, which is a continuation-in-part of Ser. No. 535,866, Sep. 26, 1983, Pat. No. 4,616,237. This application Feb. 8, 1988, Ser. No. 153,059

Claims priority, application United Kingdom, Sep. 27, 1982, 8227500

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.[5] G01D *15/34*; B05D *3/00*; B32B *15/04*; G03C *1/00*

U.S. Cl. 346—135.1 19 Claims



1. An optical data storage medium which comprises an optically sensitive layer at or adjacent to one surface of the medium, said one surface of the mediium comprising a heat sensitive material having a plurality of topographical features or structures disposed in a regularly repeating textured pattern, said pattern and overcoated with a thin film of a metallic material which conforms to the topograph of said surface, being free from undercutting so that the medium can be produced and/or replicated by molding, casting, embossing or similar process against a tool.

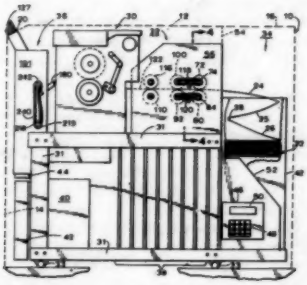
4,928,133
PRINTER AND METHOD

Alfred L. Fulton, Huntsville, Ala., assignor to SCI Systems, Inc., Huntsville, Ala.

Filed Feb. 3, 1989, Ser. No. 306,804

Int. Cl.[5] G01J *15/00*

U.S. Cl. 346—150 40 Claims



1. A printer for printing information on individual sheets in a strip in which said sheets are fastened sequentially to other sheets at separation lines where said sheets are weakened for ease of separation, said printer comprising, in combination, a print engine, sheet separator means, feed means for feeding said strip into said separator means, detecting means for detecting each of said separation lines, holding means for holding said sheets against longitudinal motion due to lateral distortion of said sheets in the vicinity of said separation lines during separation, and means for passing a separation member through said sheet in the vicinity of said separation lines so as to separate said sheets from one another along said lines.

40. Apparatus as in claim 39 in which said sheet is a relatively stiff ticket blank, said ticket blank driving said belt and said idler roller, under the motive force of said drive roller, to ensure that the surface of said idler roller moves at the same speed as said blank, said guide means being positioned to guide said blank into the nip between said drive roller and said belt, and said idler roller and said belt.

4,928,134
PLATEN FOR THERMAL TRANSFER PRINTER

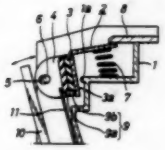
Tai Hasegawa; Jun Monnai, and Masatoshi Matsuzaki, all of Kobe, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 76,481, Jul. 22, 1987, Pat. No. 4,816,842. This application Mar. 8, 1989, Ser. No. 320,515

Claims priority, application Japan, Jul. 29, 1986, 61-178169; Jul. 29, 1986, 61-116477

Int. Cl.[5] G01D *15/00*

U.S. Cl. 346—76 PH 17 Claims



1. A platen for a thermal transfer printer, including a support and a platen body mounted on said support and made of an elastic material, characterized in that said platen body comprises a first layer having a high hardness located on the side of a thermal printer head and a second layer having a lower hardness than that of said first layer, said second layer being located on the side of said support.

4,928,135
MECHANICAL HOLDING DEVICE FOR A FREE-STRUCTURE OPTICAL-FIBER CABLE

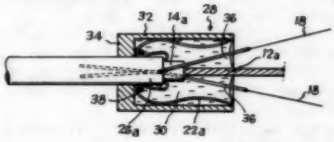
Pierre Kayoun, Boulogne-Billancourt, and Philippe Pouyez, Colombes, both of France, assignors to Amphenol Socapex, France

Filed Feb. 22, 1989, Ser. No. 313,441

Claims priority, application France, Feb. 23, 1988, 88 02167

Int. Cl.[5] G02B *6/36, 6/44*

U.S. Cl. 350—96.20 10 Claims



1. A mechanical holding device for a free-structure optical fiber cable, said cable comprising a substantially cylindrical core and an outer protective jacket, with the core being provided with peripheral grooves in which optical fibers are freely received, said device comprising a retention block which is molded directly about the core and the protective

jacket over a bared portion of each of the core and the protective jacket, wherein the device further includes a fiber-passing tube for each optical fiber, one end of each tube extending beneath the protective jacket, and each tube accommodating a respective optical fiber passing freely therealong, each tube being molded in said retention block and passing therethrough, the retention block including shaped portions, suitable for enabling the retention block to be mounted in a fixed structure.

4,928,136

IMAGE FORMING APPARATUS

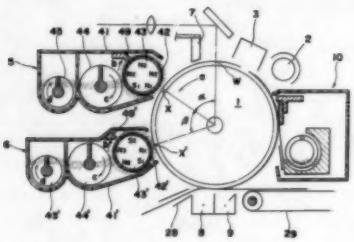
Keiji Kusumoto, and Naoyoshi Kinoshita, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Sep. 30, 1988, Ser. No. 251,666

Claims priority, application Japan, Oct. 1, 1987, 62-248789; Oct. 1, 1987, 62-248790; Oct. 2, 1987, 62-250405; Oct. 2, 1987, 62-250406; Oct. 2, 1987, 62-250407

Int. Cl.[5] G03G *21/00, 15/00*

U.S. Cl. 355—315 **11 Claims**



8. An electrophotographic copying machine capable of sequentially performing an electrophotographic copying process of imparting an electrostatic charge to the photoreceptor medium at a charging station; forming at an exposure station an electrostatic latent image on the photoreceptor medium in a pattern complemental to an image to be copied; applying toner material at a developing station to the photoreceptor medium to develop the electrostatic latent image into a visible powder image; transferring at a transfer station the powder image onto a copying sheet supplied thereto; separating the copying sheet, with the powder image having been transferred thereto, from the photoreceptor medium; and fixing the powder image on the copying sheet at a fixing station, which machine comprises:

said photoreceptor medium being supported for rotation in one direction sequentially past the charging, exposure, developing, transfer and separating stations;

a plurality of developing units disposed at the developing station for applying the toner material to the photoreceptor medium, said developing units accommodating respective toner material of different colors;

means for selectively driving the developing units one at a time for applying the toner material to form the powder image on the photoreceptor medium;

means for providing information descriptive of the respective colors of toner material in the developing units;

means for transporting the copying sheet sequentially past the transfer and separating stations and towards the fixing station;

means disposed at the transfer station for causing the powder image on the photoreceptor medium to be transferred onto the copying sheet; and

a control means operable, in reference to the information descriptive of the colors of toner material in the respective developing units and in the event that the control means determines that one of the developing units contains the toner material of a particular color substantially identical with that of the copying sheet, to cause one of the developing units to apply the toner material of such particular color to be applied to a portion of the photoreceptor medium, which corresponds in position to the leading edge of the copying sheet with respect to the direction of transport of the copying sheet, for forming a toner deposit on the leading edge of the copying sheet that is necessitated to facilitate a smooth separation of the copying sheet from the photoreceptor medium at the separating station.

4,928,137

IMAGE SENSING APPARATUS HAVING A LOW-RESOLUTION MONITOR MEANS FOR REDUCING THE AMOUNT OF INFORMATION IN AN IMAGE SIGNAL, AND SWITCHING MEANS FOR REDUCING POWER CONSUMPTION IN VARIOUS OPERATING MODES

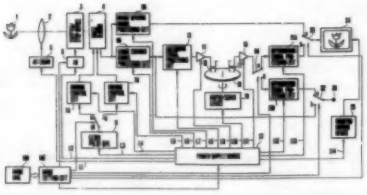
Takao Kinoshita, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 134,179, Dec. 17, 1987, abandoned, which is a division of Ser. No. 682,936, Dec. 18, 1984, Pat. No. 4,740,828. This application Aug. 3, 1989, Ser. No. 390,431

Claims priority, application Japan, Dec. 24, 1983, 58-245847; Dec. 24, 1983, 58-245848; Dec. 28, 1983, 58-251736; Dec. 28, 1983, 58-251737

Int. Cl.[5] H04N *5/335, 3/15*

U.S. Cl. 358—213.26 **27 Claims**



1. An image sensing apparatus, comprising:

(a) an image sensor having a plurality of picture elements each for forming an electrical signal;

(b) monitor means having a fewer number of picture elements than said image sensor;

(c) recording means for recording an output signal of said image sensor;

(d) switching means for selectively guiding the output signal of said image sensor to one of said monitor means and said recording means; and

(e) control means for controlling said image sensor according to a switching operation of said switching means so as to read out the respective electrical signals of said picture elements from said image sensor as the output signal of said image sensor in case said switching means guides the output signal of said image sensor to said recording means, and so as to read out the electrical signals of groups of said picture elements added together from said image sensor as the output signal of said image sensor in case said switching means guides the output signal of said image sensor to said monitor means.

5. An image sensing apparatus, comprising:

(a) an image sensor having a plurality of picture elements each for forming an electrical signal;

(b) monitor means having a fewer number of picture elements than said image sensor;

(c) output means for conducting an output signal of said image sensor to the outside of the image sensing apparatus;

(d) switching means for selectively guiding the output signal of said image sensor to one of said monitor means and said output means; and

(e) control means for controlling said image sensor according to a switching operation of said switching means so as to read out the respective electrical signals of said picture

elements from said image sensor as the output signal of said image sensor in case said switching means guides the output signal of said image sensor to said output means, and so as to read out the electrical signals of groups of said picture elements added together from said image sensor as the output signal of said image sensor in case said switching means guides the output signal of said image sensor to said monitor means.

9. An image sensing apparatus, comprising:

(a) an image sensor having a plurality of picture elements each for forming an electrical signal;

(b) switching means for selecting a first mode in which the respective electrical signals of said picture elements are read out from said image sensor as an output signal of said image sensor and a second mode in which the electrical signals of said picture elements are partially added together and read out from said image sensor as an output signal of said image sensor;

(c) exposure control means for controlling a light amount incident on said image sensor; and

(d) means for controlling said exposure control means to change the light amount incident on said image sensor according to a selecting operation of said switching means so as not to cause a difference in the level of the output signal read out from said image sensor between said first mode and said second mode.

15. An image sensing apparatus, comprising:

(a) image sensing means for sensing optical images and converting the optical images into electrical signals;

(b) switching means for selecting one of a first mode in which the electric signals are readout after partially adding them together and a second mode in which the electric signals are readout without adding them together; and

(c) control means for varying an amount of incident light to the image sensing means in response to switching operation of said switching means.

22. An image apparatus, comprising:

(a) image sensing means for sensing optical images and converting the optical images into electric signals;

(b) drive means selectively effecting reading in one of a first reading mode in which the electric signals at the image sensing means are read out in a predetermined process and a second reading mode in which said electric signals are read out while mixing them in a process where a resolution of the read out electric signals is reduced as compared with said first predetermined process; and

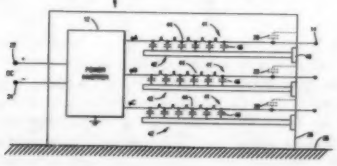
(c) control means for controlling an amount of incident light to the image sensing means in response to selection of the reading mode of said drive means.

4,928,138

POWER SUPPLY WITH INTEGRAL FILTER AND COOLING DEVICE

Derek N. Walton, Roscoe, and Richard J. Hoppe, Rockford, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jun. 30, 1989, Ser. No. 374,136
Int. Cl.[5] H02M 1/12
U.S. Cl. 363—40 **25 Claims**



1. A power supply comprising:

a chassis;

a voltage source providing an output voltage varying at a fundamental frequency and having a noise component varying as a function of time at a frequency above the fundamental frequency;

a filter including an inductance in series with the voltage source for attenuating the noise component and outputting the fundamental frequency; and

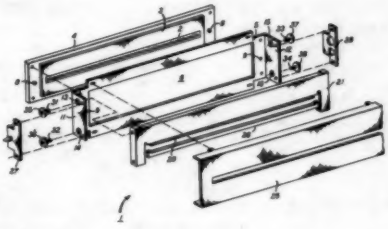
a cooling apparatus thermally and capacitively coupled to the inductor for conducting heat from the inductor and coupling the noise component to the chassis.

4,928,139

ASSEMBLY CONTAINING A LINEAR FOCUSING MEANS AND METHOD OF MAKING SAME

James T. Barton, Fairport, and Jimmy P. Walker, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 21, 1988, Ser. No. 273,770
Int. Cl.[5] G03B 27/00
U.S. Cl. 355—1 **16 Claims**



1. A linear lens array assembly comprising:

a support for receiving a linear source of radiation;

a linear lens array;

a support for said linear lens array;

one of said supports including means defining a plurality of apertures,

a pin located in each aperture and seated in the support other than the support having the aperture defining means, each pin having a cross section small compared to its aperture, and

a washer carried by each pin and having an opening approximating the cross section of its pin to restrict lateral movement of said pin, each washer being fixed by adhesive to said aperture defining means.

4,928,140

HIGH SPEED APERTURE CARD PRINTER AND METHOD

David S. Wise, Solon, Ohio, assignor to Tameran, Inc., Chagrin Falls, Ohio

Filed Mar. 7, 1989, Ser. No. 319,964
Int. Cl.[5] G03B 27/48
U.S. Cl. 355—48 **23 Claims**

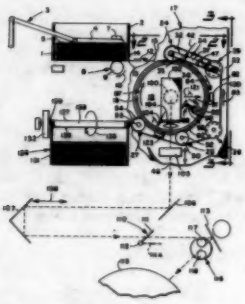
1. A high speed aperture card printer comprising:

a supply means containing one or more aperture cards, each of which carries a microfilm piece in an aperture spaced predetermined distances from the leading, trailing and side edges of the card;

means to feed aperture cards one after another from the supply means to a rotating, radiant energy transmissive cylinder so that each aperture card is directly followed by another aperture card during printing;

means to hold each aperture card fed tightly against the outer diameter surface of said cylinder for transport by the rotating cylinder without covering any part of the radially outer surface of the microfilm piece;

an optics system passing a beam of radiant energy through the rotating cylinder and microfilm piece passing thereby optically to scan any image on said microfilm piece, said optics system being operative to print the image appearing



on the microfilm piece scanned onto a plain paper copy and

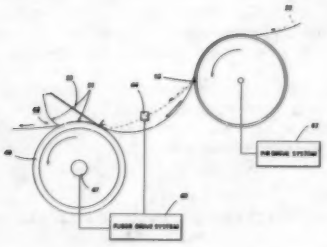
means to remove each aperture card from the cylinder after the microfilm piece has finally passed the optics system.

4,928,141

BUCKLE CONTROL FOR REDUCING INTERACTIONS BETWEEN MEDIA DRIVE SYSTEMS

Raymond E. Poehlein, Fairport; Franklin S. Reese, Victor, and John A. Adamek, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 22, 1989, Ser. No. 313,552
Int. Cl.[5] G03G *21/00, 15/20*
U.S. Cl. 355—208 **5 Claims**



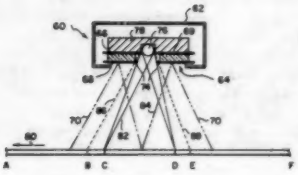
1. A system for controlling the movement of a copy media a portion of which is in frictional contact between a first and a second rotational surface and forms a buckle therebetween, the system including first drive means for controlling the rotational speed of said first surface, second drive means for controlling the rotational speed of said second surface, said first and second drive means resulting in a speed mismatch which creates a change in said buckle and a sensing means for sensing a predetermined buckle size in the portion of the copy media moving between the two rotational surfaces said sensing means adapted to generate an output signal for a predetermined length of time, said output signal applied to one of said drive means so as to cause a change in the speed of said drive means whereby the said buckle configuration is restored to its original configuration.

4,928,142

COMBINATION ERASE DEVICE

David Kloosterman, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 3, 1988, Ser. No. 252,321
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—218 **7 Claims**



1. A combination in an electrostatographic copier or printer having a moving photoconductor that includes image frame areas, interframe areas, and a halftoning dot screen layer, the combination comprising:

(a) an electroluminescent panel supported adjacent to, and crosswise behind the photoconductor, producing light that can be absorbed by the dot screen layer and thereby selectively discharging areas on the photoconductor;

(b) a slot in said electroluminescent panel extending the full width of the photoconductor;

(c) semi-transparent members, formed by a semi-transparent material sealing the electroluminescent (EL) panel, said members projecting partially into said slot; and

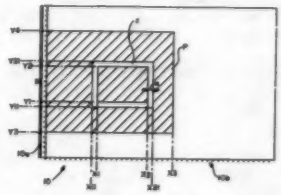
(d) a source of light, for exposing a selected area of the photoconductor, suitably producing light that can pass substantially unabsorbed by the dot screen layer, said source of light being mounted on and behind said electroluminescent panel such that its light is restricted to passage through the semi-transparent members and the unobstructed portion of said slot.

4,928,143

IMAGE FORMING APPARATUS WITH IMAGE ERASING LAMP

Yuji Okamoto, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 6, 1987, Ser. No. 106,416
Claims priority, application Japan, Oct. 9, 1986, 61-240755
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—218 **2 Claims**



1. An image forming apparatus comprising

an image erasing lamp secured between a charger for uniformly charging the surface of a photosensitive drum and a developing device and elongated in the direction of the axis of said drum, said image erasing lamp including a plurality of point light sources which can be individually switched on and off,

rectangular region setting means for specifying two X coor-

dinates and two Y coordinates and thereby setting on an original document sheet a rectangular region with sides lying along X and Y directions,

frame-shaped region determining means for adding and subtracting a value representing a specified width to or from said X and Y coordinates to thereby determine a frame-shaped region having said specified width and positioned around a region set by said rectangular region setting means, and

lamp control means for controlling the timing of switching said point light sources on and off during an image forming process such that only the region on said photosensitive drum corresponding to said frame-shaped region is exposed by said light sources and that electrostatic charges are thereby cancelled in said corresponding region on said photosensitive drum.

4,928,144

DEVELOPING DEVICE FOR A COLOR IMAGE FORMING APPARATUS

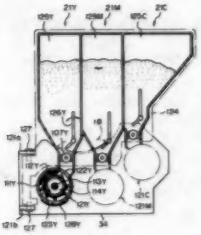
Nobuo Kasahara, 80-46, Nakazawa-cho, Asahi-ku, Yokohama-shi, Kanagawa-ken, and Susumu Wagi, Kikuchi Dai-1 Mansion, 4-12-13, Tokumaru, Itabashi-ku, Tokyo, both of Japan

Filed Apr. 22, 1988, Ser. No. 185,693

Claims priority, application Japan, May 31, 1987, 62-136035; May 31, 1987, 62-136036

Int. Cl.[5] G03G *15/06, 15/01*

U.S. Cl. 355—245 **15 Claims**



1. An image forming apparatus comprising:

(a) an image carrier;

(b) first developing means comprising a plurality of developing sections which are arranged around said image carrier, at least two of said developing sections being constructed into a single unit;

(c) second developing means comprising a single developing section disposed around said image carrier;

(d) third means for moving said first developing means back and forth between an operative position in which said at least two of said developing sections are both in operative association with said image carrier and an inoperative position in which neither of said at least two of said developing sections is in operative association with said image carrier; and

(e) fourth means for moving said second developing means back and forth between an operative position in which said single developing section is in operative association with said image carrier and an inoperative position in which said single developing section is not in operative association with said image carrier,

wherein said unit of said first developing means and said unit of said second developing means are constructed and arranged independently of each other.

4,928,145

DEVELOPING APPARATUS HAVING A BUCKET ROLLER WITH MOVABLE BUCKETS

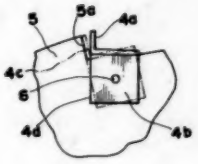
Hiroshi Okamoto; Oka Tateki; Mineyuki Sako; Tetsuo Kyogoku, and Toshikazu Suzuki, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha

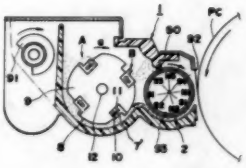
Filed Apr. 6, 1988, Ser. No. 178,344

Claims priority, application Japan, Apr. 9, 1987, 62-53836[U]

Int. Cl.[5] G03G *15/00, 15/09, 9/08*

U.S. Cl. 355—245 **6 Claims**





1. A developing apparatus comprising:

developing means for developing an electrostatic latent image formed on a photosensitive member; and

supplying means for supplying developer to said developing means including a bucket roller rotatably mounted and provided with a plurality of buckets on its periphery, said plurality of buckets being provided respectively to said bucket roller so as to move freely in accordance with the rotation of said bucket roller, and said bucket roller being given an impact due to the movement of each of said buckets.

4,928,146

DEVELOPING DEVICE

Takanobu Yamada, Osaka, Japan, assignor to Minolta Camera Co., Ltd., Osaka, Japan

Filed Mar. 29, 1989, Ser. No. 330,196

Claims priority, application Japan, Apr. 1, 1988, 63-81974; Apr. 4, 1988, 63-83501

Int. Cl.[5] G03G *15/09, 15/01*

U.S. Cl. 355—253 **18 Claims**

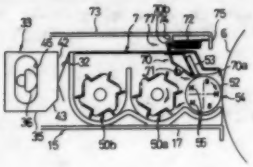
1. A developing device for developing an electrostatic latent image on an image support member, comprising:

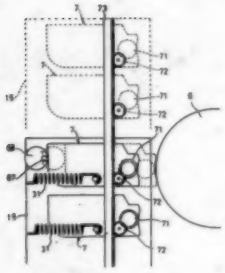
a plurality of developing units having developing rolls which are rotatively driven for supplying different colored developers to the image support member;

a position changeover means for switching over positions of each developing unit between a developer supply location adjacent to the image support member and a developer non-supply position away from the image support member;

a developer condition regulating means for regulating the condition of developer on the developing roll to lower the height of the developer at least at the portion where the developing roll faces the outside of the developing unit; and

an interlocking means for actuating or stopping the action of the developer regulating means correlatively with the movement of each developing unit between the developer supply location and the developer non-supply position.





4,928,147

PRINTERS WITH SIMPLEX AND DUPLEX CUT SHEET FUSING

Gerald W. Baumann; Albert N. Garthwaite, both of Boulder, and Carl D. Hutchings, Longmont, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 27, 1989, Ser. No. 316,261

Int. Cl.[5] G03G *15/20*

U.S. Cl. 355—288 10 Claims

1. Apparatus for handling transfer of fusible material corresponding to images from an image generator to discrete sheets of media in either simplex or duplex form comprising

a source for producing media sheets seriatim,

a transfer station means including means for motivating the fusible material from the image generator to the media sheets,

means for introducing media sheets from said source to said transfer station means,

first and second flash fusing means for fusing the fusible material to the media sheets,

first and second output paths from said transfer station means each including a respective one of said flash fusing means,

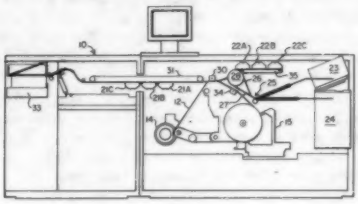
one of said output paths including means for returning received media sheets to said transfer station means for receiving image defining fusible material on the side thereof opposite the side which received the first image from said transfer station means,

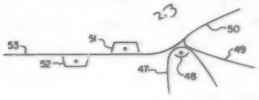
means producing a signal indicative that duplex image transferring is to occur,

means responsive to said signal producing means for selectively switching the output from said transfer station means to said one of said output paths and for otherwise directing the output of said transfer station means to the other of said output paths,

an electrical power source means, and

control means selectively coupling said electrical power source means for actuating one of said flash fusing means which has a media sheet in proximity thereto for causing said actuated flash fusing means to fuse the fusible material on that media sheet.





4,928,148

FIXING DEVICE SELECTIVELY OPERABLE IN COLOR OR BLACK/WHITE COPING MODE

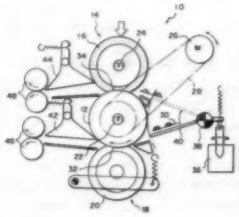
Yuichirou Higashi, Kagoshima, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 4, 1989, Ser. No. 416,971

Claims priority, application Japan, Oct. 6, 1988, 63-250887; Dec. 8, 1988, 63-308785

Int. Cl.[5] G03G *15/20*

U.S. Cl. 355—290 5 Claims



1. A fixing device for a dry process copier selectively operable in a black-and-white copy mode which uses a black toner, and a full-color copy mode which transfers color-separated images one upon another to a paper sheet, comprising:

a first fixing roller comprising a rigid roller and having a heat source in said first fixing roller;

a second fixing roller coated with an elastic layer and having a heat source in said second fixing roller, said second fixing roller being pressed against said first fixing roller to rotate, in a pressing portion, in a same direction and at a same linear speed as said first pressing roller;

a pressing roller coated with an elastic layer and pressed

against said first fixing roller to rotate, in a pressing portion, in a same direction and at a same linear speed as said first fixing roller;

guide means movable between a first position for guiding a paper sheet fed from an image transfer station to a first nipping section which is defined between said first fixing roller and said pressing roller such that an image surface of said paper sheet contacts said first fixing roller, and a second position for guiding said paper sheet to a second nipping section defined between said first fixing roller and said second fixing roller such that said image surface contacts said second fixing roller;

drive means for selectively rotating said first fixing roller in opposite directions; and

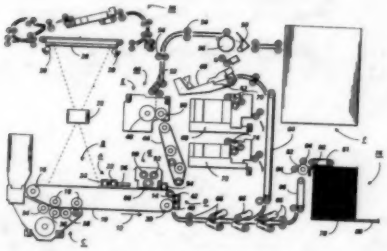
control means for controlling said first fixing roller and said drive means such that in the full-color copy mode said guide means assumes the second position and said first fixing roller is rotated in a direction for transporting the paper sheet in a predetermined direction in said second nipping section while, in a black-and-white copy mode, said guide means assumes the first position and said first fixing roller is rotated in a direction for transporting said paper sheet in said predetermined direction in said first nipping section.

4,928,149

CONTAMINANT CLEANER

James E. Harmon, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 3, 1989, Ser. No. 318,388
Int. Cl.[5] G03G *15/08, 15/09*
U.S. Cl. 355—305 **15 Claims**



1. A device for preventing particles being transported on a moving image receiving member from contaminating processing stations located thereafter, including:

a support member positioned before the processing station in the direction of movement of the image receiving member; and

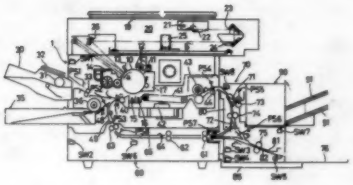
operator removable means, mounted on said support member, for attracting magnetic particles advancing with the image receiving member to prevent the magnetic particles from contaminating the processing station located thereafter.

4,928,150

COPY APPARATUS HAVING PLURAL COPY SHEET DISCHARGE TRAYS FOR DIFFERENT SIZED COPY SHEETS

Yoshihiko Hatta, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 21, 1988, Ser. No. 184,502
Claims priority, application Japan, Apr. 23, 1987, 62-100273; Aug. 7, 1987, 62-198478; Aug. 7, 1987, 62-198479
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—311 **6 Claims**



1. An image forming apparatus comprising:

sheet feed means;

size evaluating means for evaluating a size of a sheet transported by said sheet feed means;

image forming means for forming an image on the sheet transported by said sheet feed means;

a first sheet discharge section for discharging the sheet;

a second sheet discharge section provided separately from said first sheet discharge section;

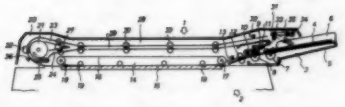
sheet re-feed means for transporting the sheet having one side thereof formed with the image by said image forming means to said image forming means again, said sheet re-feeding means including a switchback transport roller pair rotatable in a first direction for feeding the sheet toward said image forming means and in a second direction opposite to said first direction for feeding the sheet toward the second discharge section;

control means for providing at least a sheet re-feeding mode for transporting the sheet having one side thereof formed with the image by said image forming means to said image forming means again and then transporting the sheet to said first sheet discharge section, said control means being operable in said re-feeding mode to deliver the sheet to said second sheet discharge section without delivering the sheet to said first sheet discharge section when said size evaluating means judges the sheet to be unfit for re-feed.

4,928,151

APPARATUS FOR AUTOMATICALLY AND CIRCULATIVELY FEEDING ORIGINALS

Shiro Saeki, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 25, 1988, Ser. No. 223,333
Claims priority, application Japan, Jul. 30, 1987, 62-191114
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—320 **11 Claims**

1. An apparatus for automatically and circulatively feeding originals comprising:

an original feed-out section for sequentially feeding out the originals stacked therein from an original placed at a

lowermost position, each image to be copied of the stacked original being kept facing downwardly;

an original exposure section disposed along the direction of movement of the fed-out original for exposing the fed-out original;

an original reversing section disposed on the opposite side to the original feed-out section with respect to the original exposure section, and having a reversing roller capable of rotating in both clockwise and counterclockwise directions for reversing the direction of movement of the original exposed at the original exposure section;

a first reversing path extending from a top of the reversing roller in the direction of the original feed-out section for guiding the original in the direction opposite to the direction of movement of the exposed original by means of clockwise rotation of the reversing roller when both-side copy is performed;

a second reversing path extending from a bottom of the reversing roller in the direction of the original feed-out section for guiding the original in the direction opposite to the direction of movement of the exposed original by means of counterclockwise rotation of the reversing roller when single-side copy is performed;

a conveyance path connected at one end thereof with the first and second reversing paths and extending from the connected portion of the first and second reversing paths in the direction of the original feed-out section;

an original discharge section connected to the other end of the conveyance path and disposed above the original feed-out section for discharging the original conveyed along the conveyance path thereinto;

wherein the original discharge section comprises:

a discharge sensor for checking the presence of the original fed out of the conveyance path;

a discharge roller for discharging toward one end of an original table the original fed out of the conveyance path; and

a pull-back roller connected to the discharge roller through a lever for guiding the original discharged by the discharge roller to the vicinity of the separation roller.

4,928,152

PROCESS AND DEVICE FOR OPTICALLY MEASURING THE DISTANCE AND THE VELOCITY OF A TARGET

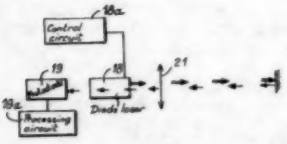
Jean-Pierre Gerardin, Nanterre, France, assignor to Electricite De France, Paris, France

Filed Feb. 24, 1987, Ser. No. 17,646

Claims priority, application France, Feb. 24, 1986, 86 02515

Int. Cl.[5] G01C 3/08; G01P 3/36

U.S. Cl. 356—5 **10 Claims**



1. Process for optically measuring the distance between a target and a given location, comprising sending toward the target a radiation having a periodically varying wavelength from a monomode coherent light source placed at said location by supplying said source with a signal of variable power, receiving the radiation retroradiated by said target, re-injecting said retroradiated radiation into the cavity of said light source, and receiving on a photodetector placed at the rear of said cavity the beat between said retroradiated radiation and the radiation from said source, the frequency of the beat which is proportional to the delay of the retroradiated wave being representative of the distance between said source and said target, wherein the monomode coherent light source is a laser diode whose property of wavelength variation is a function of the supply power, said signal of variable power being supplied to said diode directly.

4,928,153

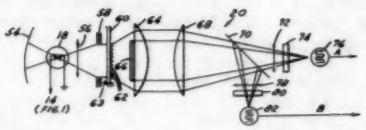
OPTICAL MEASUREMENT OF PARTICLE CONCENTRATION

Alexander J. Glass, Ann Arbor, Mich., assignor to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Apr. 6, 1987, Ser. No. 34,995

Int. Cl.[5] G01N 21/27, 15/06

U.S. Cl. 356—343 **17 Claims**



1. A method of measuring concentration of particles of size not greater than one micrometer, said method comprising the step of:

(a) directing light energy through a test medium containing said particles,

(b) measuring intensity of light energy transmitted through said medium simultaneously at two wavelengths having differing extinction coefficients as a function of particle size and wavelength, and

(c) indicating particle concentration as a function of a difference between said intensities measured in said step (b).

4,928,154

EPITAXIAL GALLIUM ARSENIDE SEMICONDUCTOR ON SILICON SUBSTRATE WITH GALLIUM PHOSPHIDE AND SUPERLATTICE INTERMEDIATE LAYERS

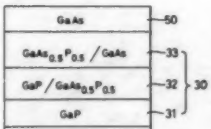
Masayoshi Umeno; Shiro Sakai, both of Nagoya, and Shinichiro Yahagi, Ohbu, all of Japan, assignors to Daido Tokushuko Kabushiki Kaisha and Nagoya Institute of Technology, both of Nagoya, Japan

Continuation of Ser. No. 903,195, Sep. 3, 1986, abandoned. This application Mar. 20, 1989, Ser. No. 325,115

Claims priority, application Japan, Sep. 3, 1985, 60-195628; Sep. 3, 1985, 60-195629; Sep. 3, 1985, 60-195630; Sep. 4, 1985, 60-195435

Int. Cl.[5] H01L 29/205, 29/04

U.S. Cl. 357—16 **7 Claims**



1. A semiconductor wafer having an epitaxial GaAs layer, comprising:

a monocrystalline Si substrate; and

at least one intermediate layer epitaxially grown on a major surface of said monocrystalline Si substrate, as a buffer layer for accommodating a lattice mismatch between said Si substrate and said epitaxial GaAs layer;

said at least one intermediate layer consisting of: a GaP layer formed on said Si substrate; a GaP/GaAsP superlattice

formed on said GaP layer; and a GaAsP/GaAs superlattice formed on said GaP/GaAsP superlattice, said epitaxial GaAs layer being formed on said GaAsP/GaAs superlattice, wherein said GaP layer has a greater thickness than the total thickness of said superlattices; and

said GaP/GaAsP superlattice and said GaAsP/GaAs superlattice having an average lattice constant between the lattice constant of said Si substrate and the lattice constant of said GaAs layer.

4,928,155

LATERAL CONDUCTIVITY MODULATED MOSFET

Akio Nakagawa, Hiratsuka; Hiromichi Ohashi, Yokohama; Yoshihiro Yamaguchi, Urawa; Kiminori Watanabe, Kawasaki, and Thuneo Thukahoshi, Zushi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

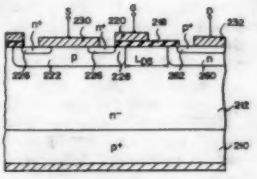
Continuation of Ser. No. 19,337, Feb. 26, 1987, Pat. No. 4,782,372, which is a continuation of Ser. No. 738,188, May 28, 1985, Pat. No. 4,672,407. This application Jun. 10, 1988, Ser. No. 205,365

Claims priority, application Japan, May 30, 1984, 59-110244; Sep. 29, 1984, 59-204427; Nov. 20, 1984, 59-244811

The portion of the term of this patent subsequent to Nov. 1, 2006, has been disclaimed.

Int. Cl.[5] H01L *29/78*

U.S. Cl. 357—23.4 **6 Claims**



1. A lateral conductivity modulated metal oxide semiconductor field effect transistor, comprising:

a semiconductor substrate;

a high resistance semiconductor layer formed over said semiconductor substrate and having a high resistance;

a semiconductor region of a first conductivity type formed in a surface of said high resistance semiconductor layer and having an impurity concentration higher than that of said high resistance semiconductor layer;

a drain region of a second conductivity type formed and located in said semiconductor region;

a base region of the second conductivity type formed in said surface of said high resistance semiconductor layer, said base region surrounding a window of said high resistance semiconductor layer which is in said surface;

a source region of the first conductivity type formed and located in said base region;

a gate insulating film formed on a channel region which is formed in a surface of said base region between said semiconductor region and said source region;

a gate electrode formed on said gate insulating film and extending over said high resistance semiconductor layer;

a source electrode ohmicly contacting said source region and said base region; and

a drain electrode ohmicly contacting said drain region, whereby said lateral conductivity modulated metal oxide semiconductor field effect transistor can be operated under such conditions wherein a latch up current is larger than a saturation current.

4,928,156

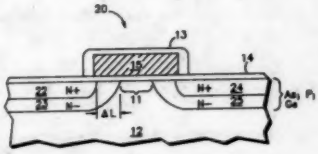
N-CHANNEL MOS TRANSISTORS HAVING SOURCE/DRAIN REGIONS WITH GERMANIUM

John R. Alvis; James R. Pfiester, both of Austin, Tex., and Orin W. Holland, Oak Ridge, Tenn., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 72,932, Jul. 13, 1987, Pat. No. 4,837,173. This application Mar. 6, 1989, Ser. No. 319,000

Int. Cl.[5] H01L *29/78, 27/02, 29/167*

U.S. Cl. 357—23.4 **5 Claims**



1. An n-channel MOSFET having at least one source or drain region improved with germanium, comprising:

a semiconductor substrate having a surface;

a thin dielectric layer on the surface of the semiconductor substrate;

a patterned gate of conductive material on the thin dielectric layer, where the gate has opposite sides; and

source and drain regions in the semiconductor substrate on the opposite sides of and beneath the gate, defining a channel in the semiconductor substrate between the source and drain regions, where at least one of the source and drain regions has germanium atoms in a first region, and phosphorus atoms in a second region of the semiconductor substrate, where said first region and said second region are in a relationship but not coextensive with each other.

4,928,157

PROTECTION DIODE STRUCTURE

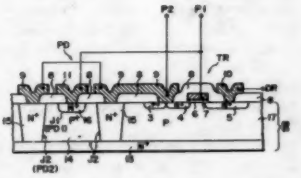
Taira Matsunaga, and Takashi Kimura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 5, 1989, Ser. No. 333,370

Claims priority, application Japan, Apr. 8, 1988, 63-86622

Int. Cl.[5] H01L *29/78*

U.S. Cl. 357—23.13 **6 Claims**



1. A protection diode structure for an insulated gate type semiconductor device which includes a semiconductor substrate layer of a first conductivity type and a gate electrode formed above and insulated from said semiconductor substrate layer and in which a driving voltage is applied between said gate electrode and said semiconductor substrate layer to create an inversion layer of a second conductivity type in the surface area of said semiconductor substrate layer in an operating mode, comprising:

a first semiconductor layer of the first conductivity type;

a second semiconductor layer of the second conductivity type formed in the surface area of said first semiconductor layer and connected to said gate electrode; and

a third semiconductor layer of the second conductivity type formed to surround said first semiconductor layer, substantially uniformly separated from said second semiconductor layer, and connected to said semiconductor substrate layer;

wherein said first and second semiconductor layers constitute a first PN junction diode having a breakdown voltage higher than the driving voltage and lower than the gate withstand voltage of said insulated gate type semiconductor device, and said first and third semiconductor layers constitute a second PN junction diode having a breakdown voltage lower than the gate withstand voltage of said insulated gate type semiconductor device and having a PN junction area larger than said first PN junction diode.

4,928,158

SOLID-STATE IMAGE SENSOR HAVING A PLURALITY OF HORIZONTAL TRANSFER PORTIONS

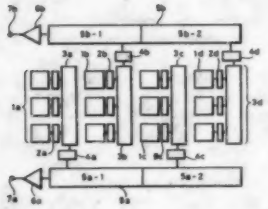
Masafumi Kimata, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 19, 1988, Ser. No. 260,135

Claims priority, application Japan, Oct. 20, 1987, 62-264977

Int. Cl.[5] H01L *29/78, 27/14;* **H04N** *3/14;* **G11C** *19/28*

U.S. Cl. 357—24 **17 Claims**



1. A solid-state image sensor having a semiconductor substrate, said sensor comprising:

a plurality of photoelectric conversion means arranged in column groups including at least a first column group and a second column group, for converting a light signal received to packets of electrical charge,

first charge transfer means for reading out a first electric signal corresponding to a plurality of said packets of electrical charge converted by said photoelectric conversion means arranged in said first column group and transferring said first electric signal,

second charge transfer means for reading out and transferring said first electric signal transferred by said first charge transfer means,

first output means for outputting said first electric signal transferred by said second charge transfer means,

third charge transfer means for reading out and transferring a second electric signal corresponding to a plurality of said packets of electrical charge converted by said photoelectric conversion means arranged in said second column group,

fourth charge transfer means for reading out and transferring said second electric signal transferred by said third charge transfer means, and

second output means for outputting said second electric signal transferred by said fourth charge transfer means, and wherein a direction of transfer of said first electric signal by said first vertical transfer means and a direction of transfer of said second electric signal by said second vertical transfer means are opposite to each other.

4,928,159

SEMICONDUCTOR DEVICE

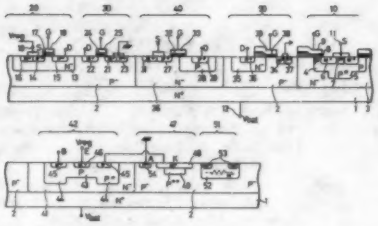
Teruyoshi Mihara, Yokosuka, and Tsutomu Matsushita, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 5, 1988, Ser. No. 279,888

Claims priority, application Japan, Dec. 4, 1987, 62-305953

Int. Cl.[5] H01L *27/02*

U.S. Cl. 357—42 **5 Claims**



1. A semiconductor device, comprising:

a semiconductor substrate having a first conductivity type, to which a power voltage is applied;

an isolation layer having a second conductivity type, grown on the semiconductor substrate, a ground voltage being applied to the isolation layer;

a vertical MOSFET having a substantial drain region of a first well region having the first conductivity type, formed in the isolation layer to reach the semiconductor substrate therethrough and being used as output means for a load;

a P-channel MOSFET formed in a second well region having the first conductivity type, which is formed in the isolation layer, a constant voltage lower than the power voltage being applied to the second well region; and

an N-channel MOSFET formed in the isolation layer, the P-channel and N-channel MOSFETs constituting a CMOS circuit constructing a peripheral circuit for the vertical MOSFET.

4,928,160

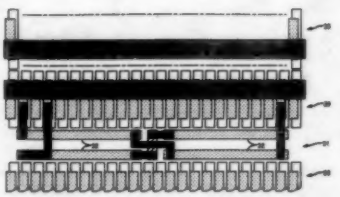
GATE ISOLATED BASE CELL STRUCTURE WITH OFF-GRID GATE POLYSILICON PATTERN

Harold S. Crafts, Fort Collins, Colo., assignor to NCR Corporation, Dayton, Ohio

Filed Jan. 17, 1989, Ser. No. 297,355

Int. Cl.[5] H01L *29/34, 27/02, 27/10*

U.S. Cl. 357—54 **8 Claims**



1. A two metal layer integrated circuit gate array configured from a chain of polysilicon gate isolated field effect transistors, comprising:

a grid reference to the source/drain regions of the field effect transistors;

a first metal layer pattern referenced to the grid;

a second metal layer pattern referenced to the grid;

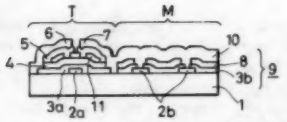
a source/drain contact referenced to the grid;
an intermetal via referenced to the grid; and
a gate polysilicon pattern referenced to the half grid.

4,928,161

THIN-FILM TRANSISTOR AND WIRING MATRIX DEVICE AND ITS FORMING METHOD

Kenichi Kobayashi, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jul. 10, 1987, Ser. No. 71,951
Claims priority, application Japan, Jul. 11, 1986, 61-164320
Int. Cl.[5] H01L *23/48, 29/46, 29/54*
U.S. Cl. 357—71 **8 Claims**



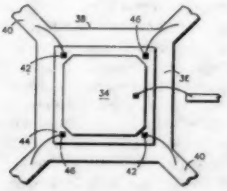
1. A thin-film transistor device, comprising:
a substrate;
a thin-film transistor formed on said substrate including a first conducting layer deposited on said substrate, a gate insulating layer deposited on said first conducting layer, a semiconductor layer deposited on said gate insulating layer, and source and drain electrodes deposited on said semiconductor layer; and
a multi-level wiring section including a first conducting wiring layer deposited on said substrate, a wiring insulating layer deposited on said first conducting wiring layer, and a second conducting wiring layer deposited on said wiring insulating layer, contacting said first conducting wiring layer and electrically connected to a portion of said thin-film transistor;
said gate insulating layer and said wiring insulating layer being made of a same inorganic material and being of the same thickness.

4,928,162

DIE CORNER DESIGN HAVING TOPOLOGICAL CONFIGURATIONS

Israel A. Lesk, Phoenix; Ronald E. Thomas, Tempe; George W. Hawkins, Mesa, and James M. Rugg, Tempe, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 22, 1988, Ser. No. 158,486
Int. Cl.[5] H01L *23/28*
U.S. Cl. 357—72 **16 Claims**



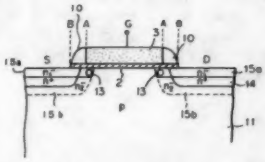
1. A semiconductor die having a plurality of circuit area corners which are void of circuitry, said circuit area corners having topological configurations thereon wherein said topological configurations include at least one dummy bond pad in each circuit area corner and a wire bond bonded to each dummy bond pad.

4,928,163

SEMICONDUCTOR DEVICE

Toshihiko Yoshida, and Toru Inaba, both of Yokohama, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 839,525, Mar. 14, 1986, abandoned. This application Feb. 27, 1989, Ser. No. 315,196
Claims priority, application Japan, Mar. 20, 1985, 60-57416
Int. Cl.[5] H01L *11/14*
U.S. Cl. 357—23.3 **17 Claims**



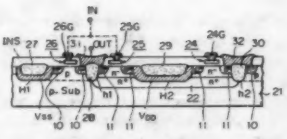
1. A semiconductor device including a semiconductor substrate with a first conductivity type and source and drain regions and a gate electrode having an edge, said source and drain regions comprising:
a first impurity region having a second conductivity type opposite said first conductivity type and having a first impurity concentration, said first impurity region formed adjacent to a surface of said substrate, and having an end approximately adjacent to the edge of said gate electrode;
a second impurity region having the second conductivity type, said second impurity region being located beneath said first impurity region and having an end that is approximately coincident with said end of said first impurity region, said second type of impurity having a diffusion coefficient larger than that of said first type of impurity;
a third impurity region located adjacent said first and second impurity regions and having the second conductivity type and being spaced from the edge of said gate electrode, said third impurity region having a third impurity concentration that is higher than said first and second impurity concentrations.

4,928,164

INTEGRATED CIRCUIT DEVICE HAVING A CHIP

Tetsu Tanizawa, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 310,024, Feb. 10, 1989, abandoned, which is a continuation of Ser. No. 932,288, Nov. 19, 1986, abandoned. This application Aug. 10, 1989, Ser. No. 393,037
Claims priority, application Japan, Nov. 19, 1985, 60-259396
Int. Cl.[5] H01L *27/10, 27/02, 29/04*
U.S. Cl. 357—45 **11 Claims**



7. A semiconductor chip comprising:
a semiconductor substrate;
an array of pairs of n-channel formation regions and p-channel formation regions, each of the pairs having an n-channel formation region and a p-channel formation region, positioned adjacent to one another on said semiconductor substrate to form adjacent pairs;
first grooves provided in said semiconductor substrate between the n-channel formation region and the p-channel formation region of each of the pairs, having insulating

material therein, for isolating the n-channel formation region and the p-channel formation region of each of the pairs from each other;

second grooves provided in said semiconductor substrate between the n-channel formation regions of the adjacent pairs in said array, having a first power source line situated therein for connecting portions of the n-channel formation regions of the adjacent pairs, and insulating material covering the first power source line; and

third grooves provided in said substrate between the p-channel formation regions of the adjacent pairs in said array, having a second power source line situated therein for connecting portions of the p-channel formation regions of the adjacent pairs, and insulating material covering the second power source line.

4,928,165

NOISE REDUCTION CIRCUIT FOR A CHROMINANCE SIGNAL OF A USING FRAME CORRELATION

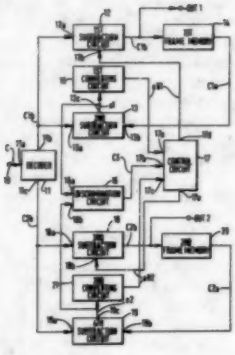
Masaaki Kisou, Chiba, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jul. 21, 1988, Ser. No. 222,609

Claims priority, application Japan, Jul. 23, 1987, 62-182204

Int. Cl.[5] H04N *9/64, 5/213*

U.S. Cl. 358—36 **4 Claims**



1. A circuit for reducing noises in a chrominance signal in a television receiver, comprising:

decoding means for decoding first and second color difference signals from a received chrominance signal, the first and second color difference signals each including a noise component;

means for generating a first frame difference signal in response to two successive first color difference signals and a second frame difference signal in response to two successive second color difference signals;

means for generating a first compensation signal from the first frame difference signal and second compensation signal from the second frame difference signal;

means for reducing noise from the color difference signals in response to the compensation signals;

discrimination means for discriminating whether both the first and second frame difference signals are smaller than a prescribed level and for generating a control signal in response thereto; and

means for transferring the compensation signals from the extracting means to the reducing means in response to the control signal only when both the frame difference signals are smaller than the prescribed level.

4,928,166

APPARATUS FOR SUPPRESSING NOISES IN A VIDEO SIGNAL

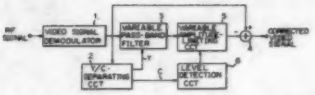
Toru Akiyama, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jul. 5, 1988, Ser. No. 215,329

Claims priority, application Japan, Oct. 30, 1987, 62-275437

Int. Cl.[5] H04N *9/87*

U.S. Cl. 358—36 **6 Claims**



1. An apparatus for suppresing noises in a reproduced color video signal having a beat component corresponding to a frequency difference between a main carrier signal and a color subcarrier signal, comprising:

signal extracting means for extracting a frequency band component of said color video signal said frequency band component including said beat component;

amplitude limiting means connected to said signal extracting means, for limiting an amplitude of an output signal of said signal extracting means; and

subtracting means connected to said amplitude limiting means and receiving said color video signal, for subtracting an output signal of said amplitude limiting means from said color video signal, wherein

said color video signal is a wide band color video signal having a bandwidth including the frequency of said beat component.

4,928,167

METHOD OF AND APPARATUS FOR EXECUTING TONE CORRECTION ON AN IMAGE ACCORDING TO A CORRECTION LEVEL

Setsuji Tatsumi; Kazuo Shiota; Hitoshi Urabe, and Osamu Shimazaki, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 3, 1987, Ser. No. 80,762

Claims priority, application Japan, Sep. 2, 1986, 61-205177

Int. Cl.[5] G03F *3/08*; H04N *1/46*

U.S. Cl. 358—80 **14 Claims**

1. An image processing method for processing input chroma signals based on look-up table data and for outputting said processed chroma signals, comprising the steps of:

producing chroma signals, each corresponding to a selected frequency value in a respective cumulation histogram which is prepared from a respective one of the input chroma signals, and producing a luminance signal corresponding to a selected frequency value in a cumulation histogram which is prepared from a luminance signal produced from said input chroma signals;

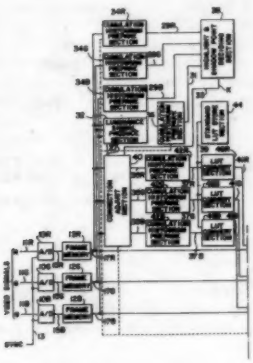
comparing said chroma signals corresponding to the selected frequency values with said luminance signal corresponding to the selected frequency value in accordance with an arithmetic relationship to determine a degree of color correction for the input chroma signals;

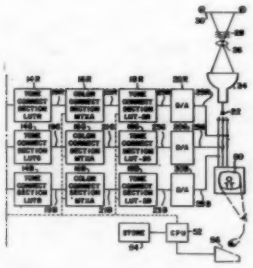
producing adjusted chroma signals by adjusting the levels of the input chroma signals in accordance with the determined degree of color correction;

setting a highlight point and a shadow point for each of the input chroma signals based on the adjusted chroma signals;

preparing look-up table data for each of the input chroma

signals on the basis of said set highlight and shadow points; and





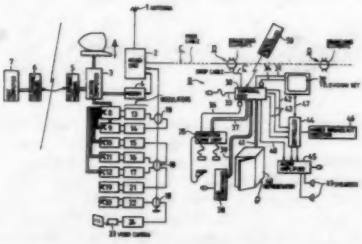
processing said input chroma signals by using said look-up table data.

4,928,168

BILLING DATA DISPLAY SYSTEM AND TERMINAL USED THEREIN FOR A CLOSED CIRCUIT TELEVISION SYSTEM

Kazuhiro Iwashita, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 21, 1989, Ser. No. 312,166
Claims priority, application Japan, Aug. 8, 1988, 63-196127
Int. Cl.[5] H04N 7/10, 9/00
U.S. Cl. 358—84 **10 Claims**



1. A billing data display system for a closed circuit TV system in which a central facility transmits video signals to a plurality of connected terminals, each of which is operated by a respective customer, said system comprising:

a computer at said central facility for storing data corresponding to charges owed by said customers;

means for requesting billing data from said central facility;

a plurality of first character generators at said central facility which are responsive to a billing data request from said terminals for converting charge data provided by said computer into video data which is transmitted to said terminals; and

means at each terminal for displaying said billing data,

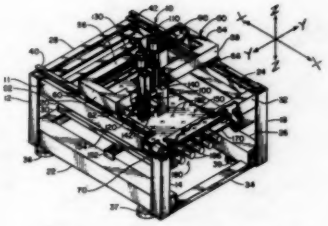
wherein said central facility further comprises means for transmitting predetermined messages to said terminals when the number of billing data requests is larger than the number of said first character generators.

4,928,169

MENSURATION FRAME GRABBING APPARATUS

Franz W. Leberl, Boulder; Milan Karspeck, Loveland; Bryan Johns, and Scott Lee, both of Boulder, all of Colo., assignors to Vexcel Corp., Boulder, Colo.

Filed Aug. 3, 1987, Ser. No. 81,118
Int. Cl.[5] H04N 7/18
U.S. Cl. 358—93 **9 Claims**



1. Mensuration frame grabbing apparatus for digitizing an image on an object, comprising:

a table;

a reseau assembly mounted in said table, including an object mounting plate for mounting the object with the image thereon in stationary position in relation to the table, a transparent reseau plate having a plurality of grid marks thereon positioned in precisely calibrated spatial relation to each other, said reseau plate being adapted for positioning on the object mounted on said object mounting plate for holding the object stationary on the mounting plate and for providing grid mark images in precisely calibrated spatial relation to each other for use in correlation with the object image;

a solid state camera positioned over the reseau plate and having a two-dimensional array of light sensor elements, each element being capable of sensing light intensity levels incident thereon independently of the other light sensor elements and outputting a signal indicative of light intensity senses on a real time basis, said camera being oriented to receive light from the object image and the reseau grid mark image;

lens means positioned between the camera and the reseau plate for magnifying the object image and grid mark image as desired and for focusing light rays comprising said images onto said array of light sensor elements in said solid state camera; and

translation camera mounting means on said table for mounting said camera and lens means over said reseau assembly and for moving said camera parallel to the reseau plate and object as well as orthogonal to said reseau plate and object;

a table coordinate system, an image coordinate system, and a frame coordinate system, each of which coordinate

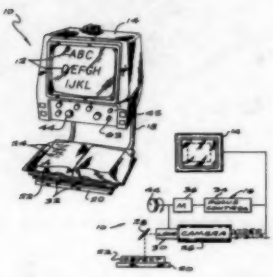
systems exists in a plane parallel to the planes of the others and which have independent spatial calibrations that can be correlated together to indicate precise mensuration data for any portion and all of an object image digitized by the camera, said table coordinate system being indicative of the position of the camera in relation to the table and the reseau grid marks, said image coordinate system being indicative of the positions of the grid marks in relation to the object image, and said frame coordinate system being indicative of the light sensor elements in the camera array of such elements in relation to the object image and grid marks.

4,928,170

AUTOMATIC FOCUS CONTROL FOR AN IMAGE MAGNIFICATION SYSTEM

Yakov G. Soloveychik, Encino, and Larry Israel, Santa Monica, both of Calif., assignors to Visualtek, Inc., Santa Monica, Calif.

Filed Jun. 21, 1988, Ser. No. 209,704
Int. Cl.[5] H04N 7/18
U.S. Cl. 358—94 **13 Claims**



1. A closed circuit television system, comprising:

a support frame including a platen for supporting an object to be viewed;

a video camera on said support frame, said camera having an adjustable focusing lens and including means for generating a video signal representative of an image of the object supported on said platen;

a video monitor connected to said camera for receiving said video signal and for displaying the image represented by said video signal; and

automatic focus control means responsive to selected characteristics of said video signal for adjusting said focusing lens to achieve substantially optimum resolution for the image displayed by said monitor, said focus control means including a motor coupled to said focusing lens for adjusting the focus setting of said lens, and a focus control circuit including controller means responsive to said selected characteristics of the video signal for operating said motor to adjust the focus setting of the lens;

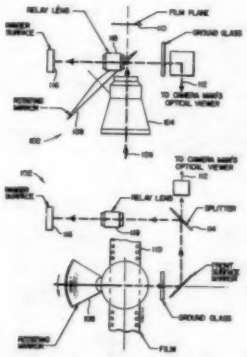
said focus control circuit including means responsive to said video signal for generating a focus signal having a magnitude representative of image focus quality, means for activating said control circuit in a scan mode for operating said motor to adjust said focusing lens rapidly, means for analyzing said focus signal in said scan mode to detect said focus signal in excess of a predetermined threshold, means responsive to the detection of said focus signal in excess of said predetermined threshold to operate said control circuit in a fine adjustment mode for operating said motor to adjust said focusing lens in incremental steps, means for detecting the magnitude of said focus signal for each of said incremental steps and for determining the difference between said detected magnitudes for adjacent incremental steps and for summing and storing the accumulated differences for a predetermined number of incremental steps throughout said fine adjustment mode, said controller means further including means for reversing the position of said lens through one-half of said predetermined number of steps when the accumulated sum substantially equals zero to place said focusing lens in a substantially optimum focus setting position.

4,928,171

VIDEO ASSIST SYSTEM FOR MOTION-PICTURE CAMERA

Donald Kline, Canoga Park, Calif., assignor to Panavision, Inc., Tarzana, Calif.

Filed Oct. 30, 1987, Ser. No. 115,145
Int. Cl.[5] H04N 3/36, 7/18
U.S. Cl. 358—97 **37 Claims**



8. A video assist system for use in conjunction with a motion-picture camera having a predetermined capture rate for a motion-picture image, said system comprising

memory means for recording infalling light in synchrony with said motion-picture camera as a plurality of periodic image frames at said predetermined capture rate; and

means for retrieving a plurality of said periodic image frames from memory means with a line retrieval rate which is independent of said capture rate and with a frame retrieval rate which is an integer multiple of said capture rate.

4,928,172

ENDOSCOPE OUTPUT SIGNAL CONTROL DEVICE AND ENDOSCOPE APPARATUS MAKING USE OF THE SAME

Masao Uehara; Akinobu Uchikubo; Katsuyuki Saito; Masahide Kanno; Jun Hasegawa; Masahiko Sasaki; Katsuyoshi Sasagawa, and Shinji Yamashita, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,777
Claims priority, application Japan, Jan. 7, 1988, 63-001845
Int. Cl.[5] H04N 7/18, 5/52; A61B 1/06
U.S. Cl. 358—98 **22 Claims**

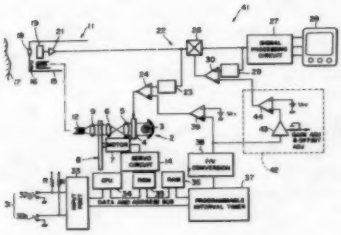
1. An endoscope output signal control device comprising:

light quantity varying means for varying a quantity of light

incident to an imaging means for forming an endoscopic image;

light quantity setting means for variably setting the quantity of incident light by driving said light quantity varying means;

automatic gain control means for conducting control to maintain a signal from said imaging means substantially at a constant level; and



automatic gain control eliminating means for eliminating, at least when a level of the signal from said imaging means is within range controllable by said light quantity varying means, any influence of said automatic gain control means on a change in the level of said signal caused by a change in a level of light quantity set by said light quantity setting means.

4,928,173

PICTURE DISPLAY DEVICE

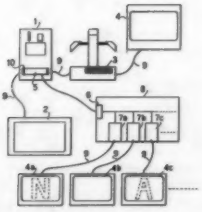
Takahiko Yamamuro, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 22, 1989, Ser. No. 369,831

Claims priority, application Japan, Nov. 17, 1988, 63-292978

Int. Cl.[5] H04N *7/18*

U.S. Cl. 358—102 **1 Claim**



1. A picture display device comprising:

an image file controller for storing inputted pictures in arbitrarily taken state and for controlling the whole device;

a flat visual terminal being an operation terminal of said image file controller;

a picture input/output device connected to said image file controller for taking the pictures and outputting the picture indication signals;

displays connected as indication parts to said picture input-/output device for monitoring the inputted pictures of said picture input/output device and for indicating the stored pictures of said image file controller;

a buffer board connected to said image file controller; and

an increased unit having a plurality of frame memory boards for inputting and storing the picture signals stored in said image file controller through a buffer circuit connected conductively to said buffer board in response to operation of said flat visual terminal and for indicating the pictures onto respective displays connected individually.

4,928,174

APPARATUS FOR REGISTERING A SCENE, ESPECIALLY FOR ITS REPRODUCTION ON THE SCREEN OF A VIDEO MONITOR

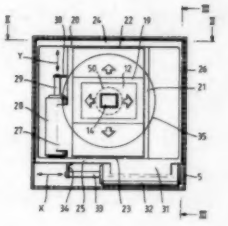
Terence M. Smith, Grebenstein, Fed. Rep. of Germany, assignor to Thyssen Industrie AG, Fed. Rep. of Germany

Filed Oct. 4, 1988, Ser. No. 253,249

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1987, 3733593; European Pat. Off., Aug. 13, 1988, 88113200.5

Int. Cl.[5] H04N *7/18, 5/30*

U.S. Cl. 358—108 **8 Claims**



1. Apparatus for viewing a scene, especially for its reproduction on a view-screen of a video monitor, comprising: a housing, a lens mounted on the housing for projecting an image of the scene on a focal plane, a video pickup disposed in the housing, situated in the focal plane and being of a bidimensional configuration for converting the brightness and, if desired, the hue of individual points of a portion of the image into electrical signals, the video pickup being smaller than the image and being mounted for rotation around an axis and for displacement over the entire image for viewing, studying and in some cases following of a selected subject within the scene, and a driving mechanism for shifting the video pickup in the focal plane, said driving mechanism containing drives acting in different directions and an additional drive for rotating the video pickup around said axis.

4,928,175

METHOD FOR THE THREE-DIMENSIONAL SURVEILLANCE OF THE OBJECT SPACE

Henrik Haggrén, Vilniementie 12 D 30, SF-02940 Espoo, Finland

PCT No. PCT/FI87/00048, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO87/06353, PCT Pub. Date Oct. 22, 1987

PCT Filed Apr. 10, 1987, Ser. No. 259,270

Claims priority, application Finland, Apr. 11, 1986, 861550

Int. Cl.[5] H04N *7/18*

U.S. Cl. 358—108 **7 Claims**

1. A method for the three-dimensional surveillance of an object space, comprising the steps of

(a) arranging at least two image acquisition devices such as video cameras to register the said object space;

(b) positioning said image acquisition devices at an angle with respect to each other to observe said object space;

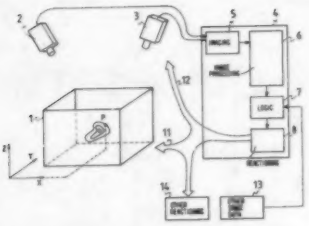
(c) digitizing the images received by the image acquisition devices;

(d) locating object points on the image planes of the image acquisition devices;

(e) calculating the space coordinates of the object points in the three-dimensional object space on the basis of the image coordinates of these object points and present constants;

(f) arranging control points in this object space;

(g) measuring the object coordinates (Xk, Yk, Zk; k=1, 2, 3. . .) of said control points;
(h) locating said control points on the image planes of the image acquisition devices;
(i) determining the projection wise image coordinates (Xki, Yki; Xkj, Ykj) of said control points on said images from the corresponding image acquisition devices whereafter said control points can be removed;
(j) calculating new orientation parameters (a_{11} . . . a_{33}) of projective resection on the basis of the image coordinate and space coordinate values of the control points;



(k) observing object points on the image planes of the image acquisition devices;
(l) registering the projectionwise image coordinates (X_1, Y_1, X_2 of said observed object points from the corresponding image acquisition device;
(m) solving the unknown object coordinates (X, Y, Z) of said observed object points in a real-time process by aid of said registered image coordinates (x, y) by making use of projective intersection and by employing the following transformation matrix:

$$\begin{vmatrix} X \\ Y \\ Z \end{vmatrix}_{ij} = \begin{vmatrix} X_o \\ Y_o \\ Z_o \end{vmatrix}_{ij} + \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}_{ij} \cdot \begin{vmatrix} x \\ y \\ o \end{vmatrix}_{ij}$$

where
X_i, Y_i, Z_i = the object space coordinates, i.e. X_j, Y_j, Z_j the coordinates of the object points in the XYZ coordinates of the object space;
X_{oi}, Y_{oi}, Z_{oi} = the constants representing the projection point o_i, o_j of each image acquisition device i, j;
a_{11} . . . a_{33} = the projective orientation parameters of the images;
x_i, y_i = the constants of the image points x_i, y_i on the image planes of each image acquisition device i, j;
i, j. = the image acquisition devices i and j.

4,928,176

ELECTRONIC CAMERA-PROCESSING CIRCUIT FOR AUTOMATICALLY TRACKING PARTICLES WHICH MOVE ACROSS AN OPTICAL IMAGE

Karl-Heinz Schmidt, Aying, and Wilhelm Waidelich, Munich, both of Fed. Rep. of Germany, assignors to Gesellschaft fur Strahlen, Fed. Rep. of Germany

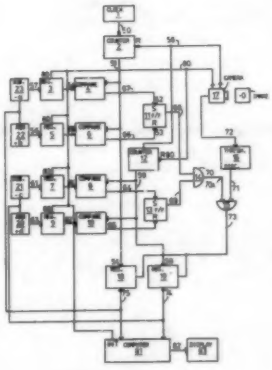
Filed Apr. 7, 1988, Ser. No. 178,645

Claims priority, application Fed. Rep. of Germany, Apr. 8, 1987, 3711918

Int. Cl.[5] **H04N** *7/18*

U.S. Cl. 358—126 **4 Claims**

1. The method of automatically tracking a single selected particle moving across an image field as a signal dot, and determining the velocity of said selected particle, comprising the steps of:
(a) scanning said image field in horizontal and vertical directions to generate an electrical output signal defining said particle, said output signal being synchronized with the scanning of each dot in said image field;
(b) generating horizontal and vertical counts corresponding respectively to the horizontal and vertical coordinates of said particle;
(c) generating start and end horizontal electronic mask aperture coordinate counts by adding and subtracting respectively first predetermined quantities to said horizontal counts, and storing said horizontal coordinate counts;
(d) generating start and end vertical electronic mask aperture coordinate counts by adding and subtracting respectively second predetermined quantities to said vertical counts, and storing said vertical coordinate counts;
(e) comparing said horizontal coordinate counts with said horizontal counts, and generating a horizontal aperture signal when said horizontal count coincides with said start



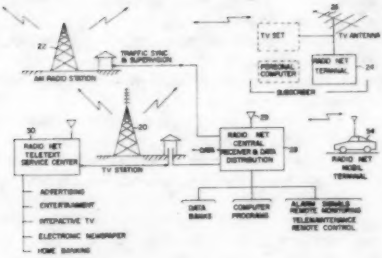
or end horizontal electronic mask aperture coordinate count;
(f) comparing said vertical coordinate counts with said vertical counts, and generating a vertical aperture signal when said vertical count coincides with said start or end vertical electronic mask aperture coordinate count;
(g) generating an electronic mask aperture signal from said horizontal and vertical aperture signals when said scanning step (a) occurs within an electronic mask defined by said horizontal and vertical electronic mask aperture coordinate counts;
(h) storing said horizontal and vertical counts when the single selected particle in said electrical output signal is within said electronic mask;
(i) repeating said steps (c) to (h) to redefine after each vertical scan said electronic mask aperture for the next scanned image field, the mask aperture for each vertical scan being determined by the position of said particle during the previous scan; and
(j) determining the velocity of said particle from the change in position thereof in successive scans.

4,928,177

TWO-WAY DATA BROADCAST NETWORKS

Louis Martinez, Cerritos, Calif., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Apr. 11, 1988, Ser. No. 179,657
Int. Cl.[5] H04N 7/08
U.S. Cl. 358—142 9 Claims



1. A two-way data broadcast network comprising;
an AM radio station for transmitting a carrier signal;
a television station;
digital data means coupled to said television station for providing digital data thereto, said television station including means for producing a television signal corresponding to at least one television channel, at least part of said television signal containing said digital data;
first communication means for communicating said television signal to a plurality of remote locations;
a plurality of remote terminals for receiving said television signal and for recovery of said digital data,
said digital data means and each of said plurality of remote terminals including means for receiving said carrier signal and developing a timing reference signal therefrom to synchronize the digital data in said television signal of said television station and the recovery of said digital data by said remote terminals;
each of said plurality of remote terminals having means for generating at least one of a predetermined plurality of non-overlapping narrow band communication channels referenced to said carrier signal;
each of said plurality of remote terminals further having means for modulating said at least one narrow band communication channel with a data signal;
second communication means for simultaneous communication of a plurality of said narrow band modulated signals, each in one of said narrow band communication channels, to a central location; and
recovery means coupled to said central location for receipt and detection of each of said data signals.

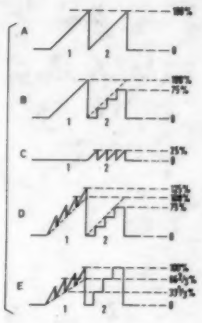
4,928,178

CONTROL OF VISUAL DISPLAY UNITS

William E. H. Hipwell, Elstree, England, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 13, 1989, Ser. No. 322,135
Claims priority, application United Kingdom, Apr. 7, 1988, 8808082
Int. Cl.[5] H04N 5/14
U.S. Cl. 358—160 5 Claims

1. Apparatus for controlling operation of a visual visual display unit from a video signal which is present only during a first period of time, such that an image corresponding to that signal can be displayed for one or more further such periods, said apparatus comprising storage means for storing digital signals representative of picture information to be displayed for one or more periods after that first period, and means for generating during the first period a correction signal which is arranged to compensate for any imprecision in the stored



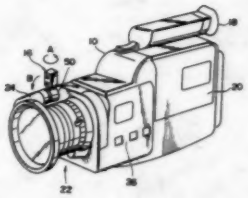
signal and which is combined with the video signal so that the display is driven by the combined signal in the first period.

4,928,179

VIDEO CAMERA CAPABLE OF EFFECTING REMOTE CONTROL OPERATION

Kimihide Takahashi; Hidemi Sasaki, and Yoshiaki Nakayama, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 12, 1989, Ser. No. 351,050
Claims priority, application Japan, May 19, 1988, 63-120658
Int. Cl.[5] H04N 7/18
U.S. Cl. 358—210 8 Claims



1. A video camera capable of effecting a remote control operation comprising:
light receiving means for a remote control;
display means for displaying in a remote control operation a state of an operation of said camera to an operator;
means for rotating said light receiving means and said display means at least in a horizontal direction with respect to a body of said camera; said
direction, respectively, of said light receiving means and said display means being capable of being varied depending on a direction in which an operator effects operation.

4,928,180

CAMERA WITH WELL DEFINED SHUTTER AND SUITABLE FOR RECORDING TELEVISION AND CINEMATOGRAPHIC IMAGES

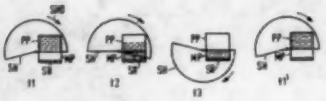
Engel J. Kuhbe, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Aug. 2, 1988, Ser. No. 227,219

Claims priority, application Netherlands, Aug. 13, 1987, 8701900

Int. Cl.[5] H04N 5/232

U.S. Cl. 358—213.13 4 Claims



1. A camera suitable for recording at least television and cinematographic images, which camera includes a solid-state sensor of the charge transfer type, said sensor comprising a picture pick-up member for converting in its pick-up elements radiation incident via a radiation path into local charge packets as information, a storage member comprising storage elements for storing the picture information, the pick-up and storage elements being present in rows and columns and the number of rows of storage elements being smaller than the number of rows of pick-up elements, and a parallel-in, series-out shift register member which is coupled to a sensor signal output for the supply of a picture signal as picture information generated in line and field periods with line and field scanning periods and line and field blanking periods, said camera also including a shutter device arranged in the radiation path towards the picture pick-up member of the sensor and a control signal generator for controlling the picture information transfer in the sensor and for controlling the shutter device for passing or not passing radiation, characterized in that the shutter device shuts off the radiation path towards the pick-up member of the sensor for a shutter time (SHT) substantially defined by the relationship SHT=TVB+((A−B)/A)TVS, where TVB is the field blanking period, TVS is the field scanning period, A is the number of rows of pick-up elements, and B is the number of rows of storage elements.

4,928,181

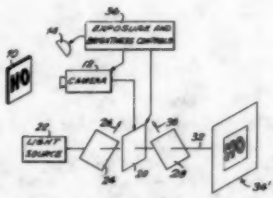
METHODS AND APPARATUS FOR OPTICALLY ENHANCING SELECTED FEATURES IN AN INPUT IMAGE

Charles N. Harward, Midlothian, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Nov. 21, 1988, Ser. No. 274,029

Int. Cl.[5] H04N 5/66

U.S. Cl. 358—230 14 Claims



1. The method of producing an optical output image in which selected portions of an input image are optically enhanced in said output image relative to other portions of said input image, said selected portions having a predetermined brightness in said input image which is substantially different from the brightness of the portions of said input image which are not to be enhanced, said method comprising the steps of:

forming a representation of said input image on a liquid crystal display which is normally illuminated by polarized light having a first predetermined polarization axis perpendicular to the optical axis of said display, and which normally has an associated transmitted light polarizer having a second predetermined polarization axis perpendicular to said optical axis for polarizing the light transmitted by said display;

illuminating said display with polarized light having a third predetermined polarization axis which is rotated by a first predetermined angle about said optical axis from said first predetermined polarization axis;

passing the light transmitted by said display through a polarizer having a fourth predetermined polarization axis which is rotated by a second predetermined angle about said optical axis from said second polarization axis to produce said output image; and

adjusting said representation so that said selected portions of said input image are optically enhanced in said output image relative to other portions of said input image;

wherein said first predetermined angle is in the range from about 30° to about 55°, and wherein said second predetermined angle is in the range from about 45° to about 65°, and has a direction of rotation which is opposite the direction of rotation of said first predetermined angle for negative enhancement.

4,928,182

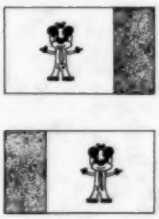
DUAL ASPECT RATIO DISPLAY WITH CYCLICLY MOVING RASTER AREA TO PREVENT UNEVEN PHOSPHOR AGING

William F. Guerinot, Knoxville; Ralph H. Bradley, Kingsport, and Stephen T. Troemel, Jefferson City, all of Tenn., assignors to North American Philips Corporation, New York, N.Y.

Filed Jan. 31, 1989, Ser. No. 304,736

Int. Cl.[5] H04N 3/223

U.S. Cl. 358—245 17 Claims



1. A method for displaying picture information on a picture display device having a display screen which is wider than pictures formed by said picture information, said method comprising the steps:

generating a dither waveform; and

causing said pictures formed by said picture information to cyclically traverse the width of the display screen of said picture display device in response to said dither waveform.

4,928,183

MANUALLY SCANNING APPARATUS WITH STRAIGHTENING ROLLERS

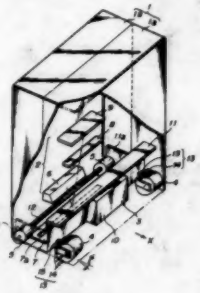
Hiroshi Yajima, Hanenishi, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Sep. 25, 1989, Ser. No. 411,720

Claims priority, application Japan, Oct. 4, 1988, 63-129546[U]

Int. Cl.[5] H04N *1/04, 1/23;* G06K *9/22*

U.S. Cl. 358—296 **7 Claims**



1. A manually operable scanning apparatus comprising:

housing means for being subjected to a manual movement on a recording medium and having an opening at the bottom thereof;

printing means disposed in said housing means for printing on said recording medium in accordance with the movement of said housing means through said opening;

roller means disposed in said housing means, a part of said roller means extending downward and out of said housing means; and

movement straightening means for rotatably coupling said roller means with said housing means and for straightening the movement of said housing means against an external thrust force urged to said housing means.

4,928,184

IMAGE RECORDING SYSTEM

Tokuichi Tsunekawa; Nobuaki Date; Hiroshi Aizawa, all of Kanagawa; Kazuya Hosoe, Machida, and Kazunori Urushibara, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 4,148, Jan. 16, 1987, Pat. No. 4,823,200, which is a continuation of Ser. No. 347,966, Feb. 11, 1982, Pat. No. 4,658,304, which is a continuation of Ser. No. 31,168, Apr. 18, 1979, Pat. No. 4,366,501. This application Feb. 10, 1989, Ser. No. 309,349

Claims priority, application Japan, Apr. 23, 1978, 53-48010; Apr. 23, 1978, 53-48011

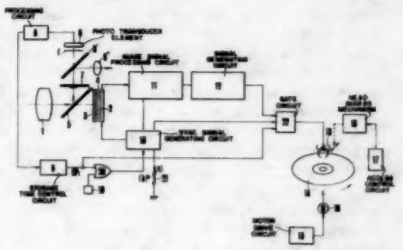
Int. Cl.[5] H04N *5/76*

U.S. Cl. 358—335 **27 Claims**

1. An image pickup device having a body, comprising, integrally contained therein:

an image pickup element for transducing an object image formation into an electrical picture image signal;

recording means for recording an output signal of said image pickup element, said recording means being capable of reproducing the recorded signal; and



display means for selectively reproducing a reproduced signal from said recording means or the output signal of said image pickup element as a visible image.

4,928,185

ROTARY HEAD TYPE RECORDING/REPRODUCING METHOD AND APPARATUS FOR RECORDING AND REPRODUCING A DIGITAL AUDIO SIGNAL

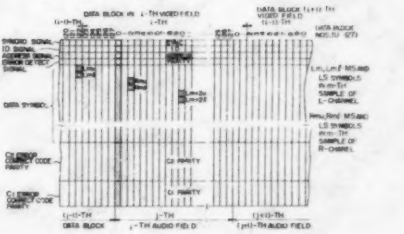
Masaharu Kobayashi, Yokohama, and Yukio Nishimura, Kamakura, both of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Video Engineering, Ltd., Kanagawa, both of, Japan

Filed Jan. 27, 1988, Ser. No. 149,171

Claims priority, application Japan, Jan. 30, 1987, 62-18400

Int. Cl.[5] G11B *20/12*

U.S. Cl. 360—19.1 **10 Claims**



1. In a rotary-head type video recorder apparatus for recording a video signal and a digital audio signal on a recording medium by means of a rotary head controlled on the basis of said video signal,

a method of recording input data indicative of an audio signal sampled to be a digital audio signal at a sampling frequency asynchronous with a cylinder rotation number of said rotary head, said method comprising:

a step of detecting a difference between a rate at which the digital audio signal is recorded on the recording medium and which is determined by the video signal and a rate of the input data determined by a sampling frequency of the audio signal for a number N of samples of the digital audio signal to be included within one field period synchronized with the video signal, where N is a non-integer positive number;

a step of setting the number of samples for the input data by preparing on the basis of the result of detection of said difference in rate at least two types of fields including a first field containing a number of samples greater than said number N within said one field period and a second field containing a number of samples smaller than said number N within said one field period;

a block forming step of forming blocks for recording said digital audio signal on said recording medium, wherein said digital audio signal is added with a first error detection/correction code every n symbols, where n is a positive integer, for thereby forming a first code arrangement, while each of the symbols of said arrangement is imparted with amounts of delay differing from one another defined as diagonal incomplete interleave for thereby forming a second code arrangement by adding a second error detection/correction code, said second code arrangement being added with a block synchronizing signal;

a step of setting the number of blocks to be recorded within said one field period synchronized with said video signal to a constant number of blocks capable of recording a greater number of data than said sample number N independent of said set number of samples; and

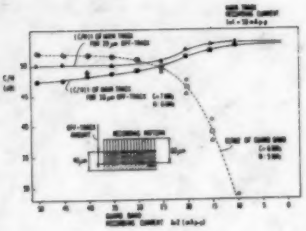
a step of recording the block-formed data of the digital audio signal on the recording medium with the rotary head.

4,928,186

MAGNETIC RECORDING METHOD AND MAGNETIC HEAD

Takashi Matsumoto; Masamichi Sato, both of Tokyo; Satoshi Yoshida, and Yoshiaki Kato, both of Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 31, 1987, Ser. No. 91,131
Int. Cl.[5] G11B *5/02*
U.S. Cl. 360—21 **9 Claims**



1. A magnetic recording method comprising the steps of:

recording first information on a main track of a magnetic disk using a first magnetic head with an adequate recording current; and

recording second information on a guard band adjacent to said recording main track using a second magnetic head having a predetermined non-zero azimuth angle relative to said first magnetic head with a magnetomotive force set within a range of 40% to 80% of a magnetomotive force of said magnetic head for said main track.

4,928,187

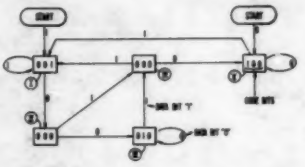
METHOD AND APPARATUS FOR ENCODING AND DECODING BINARY DATA

Theodore D. Rees, Mountain View, Calif., assignor to Laserdrive Limited, Santa Clara, Calif.

Filed Feb. 20, 1987, Ser. No. 16,949
Int. Cl.[5] G11B *5/09*
U.S. Cl. 360—40 **28 Claims**

1. Apparatus for encoding binary data in the form of serially occurring binary data bits into a series of signal transitions in order to effect high density data transmission comprising:

means for converting each said data bit in series into a predetermined one of a plurality of code words according to five states of said means for converting, each code word including three code bits, wherein a "1" code bit signifies a signal transition and a "0" code bit signifies no signal transition, such that 2, 4, 6, or 8 "0" code bits are generated between each "1" code bit; and



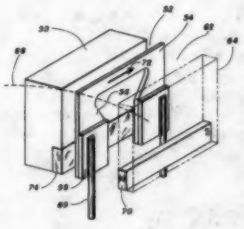
means for transmitting each said code word from said conversion means.

4,928,188

MAGNETORESISTIVE ELEMENT SANDWICHED BETWEEN A SAL FERRITE SUBSTRATEAND A COVER CONTAINING AN EASY AXIS BIASING MAGNET

George W. Brock, La Jolla, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 5, 1988, Ser. No. 214,994
Int. Cl.[5] G11B *5/30, 5/223*
U.S. Cl. 360—113 **8 Claims**



1. A magnetoresistive head comprising:

a. a substantially rigid substrate support having a substantially planar surface for deposition of said magnetoresistive head thereon, said substrate further comprising a magnetic material adapted for operation as an unsaturated soft adjacent layer,

b. a first insulating layer deposited on said planar surface of said substrate,

c. a magnetoresistive film deposited on said first insulating layer, said magnetoresistive film having an easy axis therein, said film further adapted for the flow of current therethrough along the direction of said easy axis, whereby said flow of current induces a first magnetic field in said unsaturated soft adjacent layer for hard axis biasing of said magnetoresistive film,

d. a second insulating layer deposited on said magnetoresistive film,

e. a non-magnetic coverplate adheredly covering said second insulating layer, said coverplate having a substantially planar coverplate surface,

f. a magnet located in said coverplate surface, whereby said magnet generates a second magnetic field,

g. said magnetoresistive film further comprising magnetic coupling means for coupling to said second magnetic field, whereby easy axis biasing of said magnetoresistive film is provided, and

h. said substrate further having a recessed region opposite said magnet, said recessed region being filled with a non magnetic material whereby the field of said magnet is undistorted by said substrate.

4,928,189

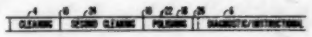
MULTIFUNCTIONAL MAGNETIC HEAD CLEANING MEDIA

Mohammed Siddiq, San Jose, Calif., assignor to Tandy Corporation, Fort Worth, Tex.

Division of Ser. No. 182,825, Apr. 18, 1988, Pat. No. 4,893,209. This application Sep. 28, 1989, Ser. No. 413,894

Int. Cl.[5] G11B *5/41*

U.S. Cl. 360—128 **6 Claims**



1. A multifunctional cleaning tape for use in a video cassette for use with a VCR, the VCR having a magnetic head, the tape comprising:

a first, nonmagnetic cleaning segment adapted to clean the magnetic head;

a nonmagnetic polishing segment, adapted to polish the magnetic head, positioned in an upstream direction relative to the first cleaning segment; and

a magnetic diagnostic/instructional segment, positioned in the upstream direction relative to the polishing segment, having diagnostic/instructional information recorded thereon to provide the user with diagnostic/instructional information regarding the status of chosen components of the VCR.

4,928,190

MAGNETIC RECORDING/REPRODUCTION APPARATUS

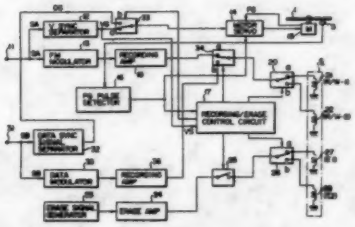
Yutaka Yunoki, Kunitachi, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Division of Ser. No. 166,875, Mar. 11, 1988, abandoned, which is a division of Ser. No. 796,573, Oct. 28, 1985, Pat. No. 4,742,404. This application Apr. 4, 1989, Ser. No. 334,287

Claims priority, application Japan, Mar. 13, 1984, 59-47865; Mar. 13, 1984, 59-47866; Mar. 13, 1984, 59-47867; Mar. 13, 1984, 59-47868; Mar. 13, 1984, 59-47869; Mar. 13, 1984, 59-47870

Int. Cl.[5] G11B *5/03, 15/12*

U.S. Cl. 360—66 **10 Claims**



1. A magnetic recording apparatus using a rotatable magnetic disc as a recording medium, comprising:

a composite magnetic head having integrated erase and read/write gaps separated from each other in a longitudinal direction of a recording track on said magnetic disc to erase and record/reproduce data with respect to said magnetic disc, said composite magnetic head being arranged carrying out 2-field image recording with respect to a pair of adjacent tracks on said magnetic disc;

double record instructing means for generating a double record instructing signal in response to an operation of a user; and

control means for controlling a head driving sequence in response to a double record instructing signal from said double record instructing means for carrying out a double recording operation, by erasing one of an image data of a pair of image data of adjacent tracks and then recording another image data on the erased track.

4,928,191

TAPE LOADING MECHANISM FOR A ROTATING DRUM AND CASSETTE TYPE MAGNETIC RECORDING AND/OR REPRODUCTION APPARATUS

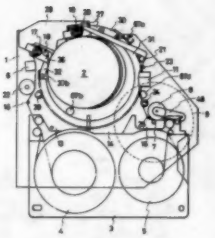
Nobuyuki Kaku, Yokohama; Tatsuya Shigemura; Masaki Uesugi, both of Katsuta; Kiyoshi Kano, and Kenji Ogiro, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 211,436

Claims priority, application Japan, Jun. 25, 1987, 62-156578; Aug. 20, 1987, 62-205004

Int. Cl.[5] G11B *15/665*

U.S. Cl. 360—85 **9 Claims**



1. A tape loading mechanism of a magnetic recording and/or reproduction apparatus comprising:

a tape guide drum means having a rotary magnetic head mounted thereon;

groups of tape guide means for withdrawing a magnetic tape from a cassette, winding the magnetic tape on said tape guide drum means and forming a travelling path for the magnetic tape;

tape guide carrier means disposed substantially concentrically with said tape guide drum means for causing said groups of tape guide means to be displaced to and from an unloading position and a loading position;

a tape guide locating means for locating and holding said groups of tape guide means as they move between the loading and loading position to define the travelling path of said magnetic tape;

said groups of tape guide means include a first group of tape guide means located and held by said tape guide locating means for substantially horizontally withdrawing said magnetic tape from said cassette, and a second group of tape guide means is located and held by said tape guide positioning means for substantially horizontally withdrawing said magnetic tape from said cassette to a predetermined position and then for obliquely pulling said magnetic tape, said tape guide carrier means are formed in an arcuate shape and are mounted so as to be rotatable around said tape guide drum means and to drive said groups of tape guide means, said tape guide carrier means are connected at one end thereof to said groups of tape guide means and are displaced at a position of height which is an intermediate height of a height of said first and second groups of tape guide means so that a plane of said tape guide carrier means rotating around said tape guide drum means is positioned between said first and second groups of tape guide means.

4,928,192

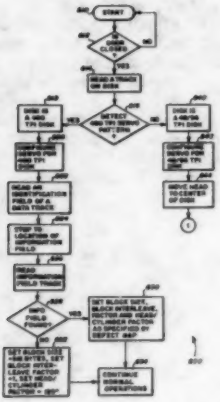
PROCESS FOR IDENTIFYING DISKS AND AUTOMATICALLY CONFIGURING A DISK DRIVE SYSTEM

Kenneth G. Bartlett, and Per-Erik Walberg, both of San Jose, Calif., assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 23, 1987, Ser. No. 137,804

Int. Cl.[5] G11B *5/596, 5/09*

U.S. Cl. 360—77.08 **18 Claims**



10. A process for automatically configuring a disk drive system for a variety of data disks comprising the steps of:

a. reading a track of a disk;

b. configuring a disk drive system for an embedded servo disk if a servo pattern is detected; and

c. configuring a disk drive system for a nonembedded servo disk if a servo pattern is not detected, said configuring comprising setting a data separator at a data rate for a high data rate type of nonembedded servo disk, and attempting to read an identification field, and if an identification field is read, then setting values for block size, blocks per track and blocks per surface as specified in said identification field.

4,928,193

DISKETTE DRIVE TYPE DETERMINATION

Robert J. Agoglia; Richard A. Dayan, both of Boca Raton, and Bruce A. Smith, Delray Beach, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 630,610, Jul. 13, 1984, abandoned. This application Feb. 18, 1986, Ser. No. 830,488

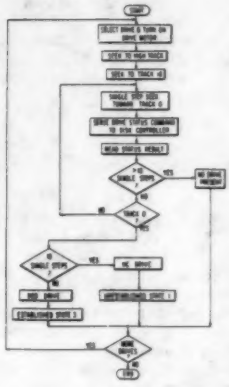
Int. Cl.[5] G11B *5/55, 21/08;* **G06F** *3/06*

U.S. Cl. 360—78.04 **14 Claims**

5. In a computer system having a device attachment port to which any one of a plurality of different types of disk drives may be attached, a method for recognizing the type of drive currently attached to said port, said method comprising the steps of:

issuing a head positioning command to said port for directing a head on a disk drive attached to said port to move to a predetermined track address;

determining the track address to which said head has been moved; and



determining the type of disk drive attached to said port in accordance with the determined track address.

4,928,194

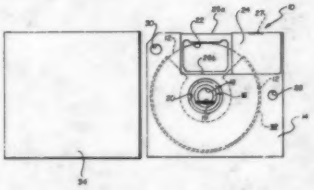
ANTI-STATIC SUPPORT FOR A CARTRIDGE IN A DISK DRIVE

James E. Elly, Rochester, and Gerald J. Kosarko, Pavilion, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 30, 1988, Ser. No. 252,233

Int. Cl.[5] G11B *5/016*

U.S. Cl. 360—97.04 **4 Claims**



1. In disk drive apparatus of the type that uses a cartridge assembly including a flexible magnetic disk and a dual-sided plastic jacket enclosing the disk, the drive apparatus including (a) a transducer disposed to extend through a window in the jacket on a windowed side thereof and magnetically interface with the disk by means of aerodynamic forces generated as the disk rotates nearby the transducer and (b) a carriage for bringing the cartridge assembly into transducing relationship with the transducer, the improvement wherein the drive apparatus comprises:

a conductive, flat-surfaced plate substantially corresponding in size to the cartridge assembly; and

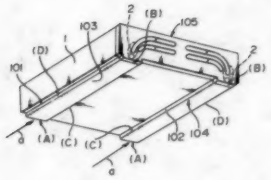
means attached to the carriage for resiliently loading said plate against the cartridge assembly opposite to said windowed side thereof so that the flat-surfaced area of said plate is substantially coextensive with the jacket.

4,928,195

IMPROVED FLOATING MAGNETIC HEAD FOR HIGH DENSITY RECORDING

Joichiro Ezaki; Yoshiaki Ito, and Mikio Matsuzaki, all of Tokyo, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Jul. 6, 1988, Ser. No. 215,524
Claims priority, application Japan, Jul. 15, 1987, 62-176631
Int. Cl.[5] G11B *5/60, 15/64, 17/32*
U.S. Cl. 360—103 **3 Claims**



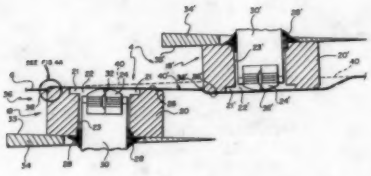
1. A magnetic head with a reading/writing element attached to an air discharge end of a slider having a flying plane on its one surface opposed to a magnetic recording medium, characterized in that the outer dimensions of said slider are so selected as to include a thickness of 0.65 mm or less from said flying plane to the opposite surface on the reverse side, a length of 1 to 3 mm in the direction of air discharge, and a width of 1 to 2.5 mm in the direction orthogonal to the air discharge.

4,928,196

MAGNETIC RECORDING DEVICE USING CIRCUMFERENTIALLY OFFSET HEADS WITH DOUBLE SIDED MEDIA

William K. Hickok; John M. Riley, both of Rochester, and Gerald J. Kosarko, Pavilion, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 4, 1988, Ser. No. 176,964
Int. Cl.[5] G11B *5/50, 21/16, 17/32*
U.S. Cl. 360—105 **16 Claims**



1. Apparatus for accessing both sides of a flexible storage medium rotating about an axis, said apparatus comprising:

first and second carriage members;

means commonly supporting said carriage members for radial movement relative to said axis;

a pair of transducers each supported by a respective carriage member, said transducers being disposed on opposite sides of the medium in relation to separate radii thereof such that a circumferential offset is maintained between said transducers;

stabilizing means surrounding said respective transducers for interacting with the disk and for generating respective pull down forces on successive portions of the rotated medium as each portion is rotated adjacent said stabilizing means; and

means acting upon at least one of said carriage members for relatively urging said transducers toward each other to cause each transducer to separately interact with the medium.

4,928,197

LOCK FOR VIDEO TAPE CASSETTE

Won B. Park, and Ju Y. Oh, both of Cheon-An, Rep. of Korea, assignors to SKC Limited, Kyongki, Rep. of Korea

Filed Jan. 4, 1988, Ser. No. 140,544
Claims priority, application Rep. of Korea, Sep. 29, 1987, 87-16528[U]
Int. Cl.[5] G11B *23/087*
U.S. Cl. 360—132 **6 Claims**

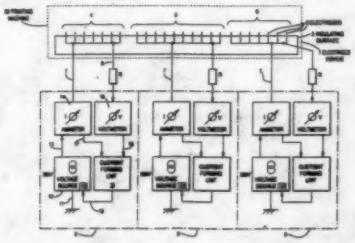
1. A unitary lock arrangement for a video tape cassette the cassette having an upper half member and a lower half member, the lock arrangement comprising a base plate with two concentric supporting shafts extending outwardly from and rotatably mountable into slots formed in a side wall of the lower half member of the cassette, said base plate including means for releasably locking together said base plate and a cassette cap, said releasably locking together means including a locking protrusion and a release button for releasing said locking protrusion from locking engagement with the cassette cap, a spring pole extending from an upper side of said base plate between said two shafts so as to align with an axis of the two concentric supporting shafts, said spring pole having a tip from which extends an abutment portion, said abutment portion having an upper face and an end face being arranged to be contacted respectively with a ceiling and a side wall of the upper half member of the cassette, whereby stresses due to forces acting on said spring pole are evenly distributed to said concentric supporting shafts.

4,928,198

HIGH VOLTAGE ELECTRODE DEVICE

Klaus Domschat, Lorrach, Fed. Rep. of Germany, assignor to Eltex-Elektrostatik-Gesellschaft mbH, Weil am Rhein, Fed. Rep. of Germany

Filed Jul. 29, 1988, Ser. No. 225,812
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1987, 3725142
Int. Cl.[5] G01R *27/02;* H02H *3/40*
U.S. Cl. 361—1 **9 Claims**



1. A high voltage electrode device comprising a plurality of individual electrodes having end portions projecting beyond an insulating surface and arranged to form at least one group of electrically connected electrodes, means for energizing and deenergizing the at least one group of electrodes, the energiz-

ing and deenergizing means including high voltage source means having control means for turning off the high voltage source means, the high voltage source means providing an output to the at least one group of electrodes via current measuring means, the current measuring means providing an output indicative of the current measured, voltage measuring means connected to the at least one group of electrodes and providing an output indicative of the voltage measured, and quotient forming means responsive to the outputs of the current measuring means and the voltage measuring means for forming a quotient thereof and providing an output when the quotient formed has a predetermined relation to a reference value, the control means being responsive to the output of the quotient forming means for turning off the high voltage source means.

4,928,199

CIRCUIT PROTECTION DEVICE

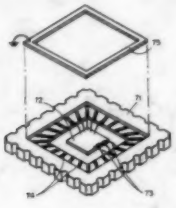
Stephen H. Diaz, Los Altos Hills; Gabe Cherian, Fremont; Stephen Morris, Los Altos, all of Calif.; John R. Vinson, Cricklade, nr. Swindon, England; David Crofts, and Anthony J. Moore, both of Cirencester, England, assignors to Raychem Limited, United Kingdom

Continuation of Ser. No. 159,473, Feb. 16, 1988, abandoned, which is a continuation of Ser. No. 71,537, Jul. 9, 1987, abandoned, which is a continuation of Ser. No. 842,108, Mar. 20, 1986, abandoned. This application Sep. 11, 1989, Ser. No. 405,409

Claims priority, application United Kingdom, Mar. 29, 1985, 8508304

Int. Cl.[5] H02H *9/04*

U.S. Cl. 361—56 **4 Claims**



1. An integrated circuit chip package which comprises

(1) a lead frame;

(2) an integrated circuit chip protected by a cavity cover comprising an electrode; and

(3) a threshold switching device for protecting the integrated circuit from a voltage transient, the switching device including a switching element formed from an amorphous composition comprising:

(a) 15 to 75 atomic % selenium;

(b) 10 to 65 atomic % arsenic; and

(c) 5 to 42 atomic % germanium, or if the composition contains less that 35 atomic % selenium, 5 to 35 atomic % germanium;

in which the proportions of (a), (b) and (c) (based on the total of (a), (b) and (c)) add up to 100%;

the composition having not more than 10 atomic % tellurium; and

the electrode being connectable to earth and an internal surface of the electrode being connectable to the composition and the chip being connected to the lead frame by wire bonds, the wire bonds being such that they contact said composition.

4,928,200

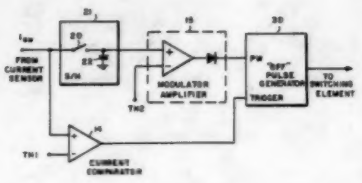
OVERCURRENT PROTECTION FOR SWITCHING MODE POWER CONVERTER

Richard Redl, Concord, and Nathan O. Sokal, Lexington, both of Mass., assignors to Cherry Semiconductor Corporation, East Greenwich, R.I.

Continuation-in-part of Ser. No. 34,098, Apr. 2, 1987, Pat. No. 4819122. This application Oct. 6, 1987, Ser. No. 106,698

Int. Cl.[5] H02H *7/12*

U.S. Cl. 361—93 **4 Claims**



1. An overload protection circuit comprising:

means for receiving an output signal from a current sensor;

means for comparing the output signal with a first threshold and for generating a signal to turn off a switching element having a minimum duty ratio in a power converter when the output signal reaches the threshold;

means for holding a peak output signal from said current sensor;

means for comparing the held peak output signal with a second threshold, said second threshold being greater than said first threshold, and for generating an "off" signal when said held peak output signal exceeds the second threshold; and

means responsive to said "off" signal for decreasing the minimum duty ratio of the switching element.

4,928,201

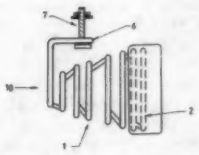
CURRENT COLLECTOR

Murray J. Wright, P.O. Box 19-574, and Gordon V. Ritchie, 21 Mavin Road, both of Christchurch, New Zealand

Filed Nov. 21, 1988, Ser. No. 274,455

Int. Cl.[5] H01G *47/00*

U.S. Cl. 361—215 **4 Claims**



1. A current collector for a pump, filter, or heater housing, the collector comprising a length of conductive wire wound spirally into a cone-like sleeve, a large end of the spiral being mounted in a plastic ring, the spiral being dimensional for sliding engagement in an inlet or outlet port of a pump, filter or heater housing with one end of said wire being connected by a connector to a grounded connection to prevent build-up of a static charge in said port.

4,928,202

COUPLER WITH COMBINATION LOCKING AND BONDING RING

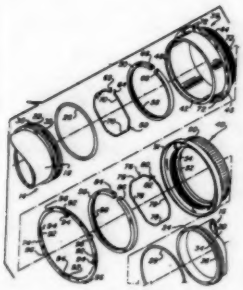
Edwin J. Gale, Aurora; Albert B. Olsen, Littleton, and John C. Dinsmoor, Denver, all of Colo., assignors to Stanley Aviation Corporation, Aurora, Colo.

Filed Dec. 12, 1988, Ser. No. 283,161

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.[5] H01R *4/64*

U.S. Cl. 361—215 **7 Claims**



1. A threaded coupling assembly for interconnecting confronting ends of first and second fluid-carrying conduit members in locking and electrical bonding relationship, said assembly comprising:

first and second coupling means threadably interconnected and circumferentially engaging the confronting ends of said conduit members to hold them in fluid communication;

a complementary peripheral facing surface on each of said coupling means which are drawn axially toward each other as said coupling means are rotatably threaded together;

a bonding jumper in the form of a ring mounted on one of said facing surfaces having at least one resilient spring finger for bearing against said other facing surface to establish an electrical bond between said first and second coupling means when said facing surfaces are axially drawn toward each other;

a plurality of recesses in said other surface for coacting with said spring fingers to yieldably resist opposed relative rotation in the unthreading direction;

at least one of said coupling means incudes an internal peripheral groove;

a split ring releasably mounted in said groove; and

a bonding wire fixedly positioned within said split ring for contacting one of said conduit members.

4,928,203

CAPACITIVE ACCELEROMETER WITH HINGES ON TOP AND BOTTOM SURFACE

James L. Swindal, East Hampton, and Walter J. Wiegand, Glastonbury, both of Conn., assignors to United Technologies, Hartford, Conn.

Filed Feb. 28, 1989, Ser. No. 317,239

Int. Cl.[5] H01G *7/00*; G01P *15/08*

U.S. Cl. 361—280 **7 Claims**

1. A solid-state accelerometer comprising:

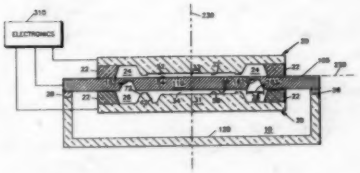
a three-plate capacitor including fixed top and bottom plates and a movable sensing plate having a top surface separated from said top plate by a top gap and a bottom surface separated from said bottom plate by a bottom gap, defining a reference plane symmetrically disposed between said top and bottom surfaces, and being connected to support members by flexible connections extending across a support gap between said reference plate and said support members to move between said top and bottom plates in response to acceleration along an acceleration axis perpendicular to said reference plane, whereby acceleration along said acceleration axis displaces said sensing plate from said reference plane and alters the capacitance between said sensing plate and said top and bottom plates, in which;

said top and bottom plates and said support members are bonded together to form a rigid structure;

said sensing plate is connected to said support members by at least two flexures extending a predetermined hinge length along opposite sides of said sensing plate and having a predetermined hinge thickness less than the length of said sensing plate, so that a communication path is established between a top chamber between said top plate and said sensing plate and a bottom chamber between said bottom plate and said sensing plate; and

at least one chamber has motion stops disposed therein and grooves to facilitate squeeze-film damping in one of said sensing plate and said fixed plate, characterized in that:

said sensing plate is connected to said support members by flexures lying substantially in said top and bottom surfaces and being disposed about said support gap in a predetermined pattern;



a first side set of hinges are positioned along a first pair of sides of said sensing plate, have a predetermined total stiffness along each of said first pair of sides and are symmetric in both said top and bottom surfaces about a first plane defined by said acceleration axis and a first axis passing through said first pair of sides perpendicular to said first pair of sides and to said acceleration axis, at least one of said first side set of hinges being in each of said top and bottom surfaces, said first side set of hinges also being symmetric in said top and bottom surfaces about a second plane defined by said acceleration axis and a second axis passing through said acceleration axis perpendicular to said first axis;

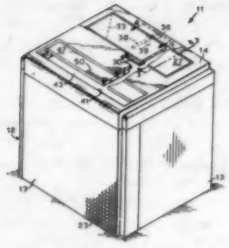
a second side set of hinges are positioned along a second pair of sides, have said predetermined total stiffness along each of said second pair of sides, and are symmetric about said second and first planes in the same manner as said first side set of hinges are symmetric about said first and second planes, respectively; and

said first and second side sets of hinges are symmetrically disposed about a pair of diagonal planes perpendicular to said reference plane and having an angle of 45 degrees with respect to said first and second planes and are also symmetrically disposed about said reference plane in that for each member of said first side set disposed in said top surface, a corresponding member of said second side set is disposed in said bottom surface and vice versa.

4,928,204
PORTABLE ELECTRICAL APPLIANCE

Jui-Shang Wang, Taipei, Taiwan, assignor to Duracraft Corporation, Sudbury, Mass.

Filed Feb. 28, 1989, Ser. No. 316,826
Int. Cl.[5] H02B 5/00
U.S. Cl. 361—331 **17 Claims**



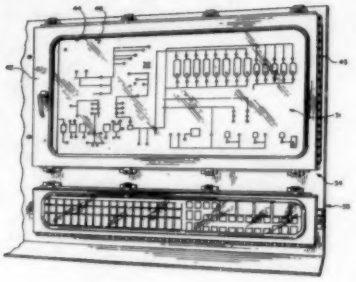
1. An electrical appliance comprising:
an electrically powered device;
electrical control means coupled to said electrically powered device;
housing means comprising top and side surface portions, said housing means mechanically coupled to said electrically powered device and said electrical control means and defining a handle chamber having an entry opening formed in one of said surface portions, said handle chamber including a recessed portion covered by a section of said one said surface portion, and said section being partially bordered by one edge portion of said entry opening; and said housing means further defining a compartment retaining said electrical control means and having an access opening formed in one of said surface portions;
a lid retained by said housing means and covering said access opening, said lid mounted for movement out of said access opening thereby permitting manual access to said electrical control means;
a handle cover retained by said housing means and covering said entry opening, said handle cover mounted for movement into said handle chamber so as to provide manual access to an inner surface of said section; and
bias means biasing said handle cover into a position covering said entry opening.

4,928,205
PANEL ASSEMBLY

David W. Duback, Glenview, and James R. Vogenthaler, Mount Prospect, both of Ill., assignors to Accurate Metering Systems, Inc., Schaumburg, Ill.

Filed Feb. 16, 1988, Ser. No. 155,856
Int. Cl.[5] H02B 1/02
U.S. Cl. 361—346 **3 Claims**

1. A panel assembly for illustrating a layout of a system, said layout forming part of said panel assembly, the status of certain elements in said layout of the system being changeable, and the panel assembly being of the type in which the certain elements can be illuminated to indicate a certain status of an element, said panel assembly comprising:
(a) a control unit housing;
(b) an inner panel having an back side and an outer face and being hingedly mounted at one side edge to said control unit housing, said inner panel having a plurality of openings formed therethrough;
(c) light emitting means mounted in said openings for projecting light outwardly from the outer face of said inner panel;
(d) wire conductor means connected on the back side of said inner panel to the light emitting means and adapted to be connected to a source of electric power;
(e) an outer panel having an outer face and an inner face and being hingedly connected along one side thereof to said control unit housing, said outer panel having openings therethrough arranged to be in alignment with said light emitting means mounted in said openings of said inner panel; and

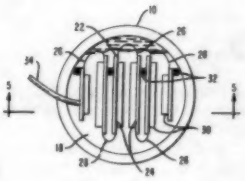


(f) said layout of said system being mounted on the outer face of said outer panel and having designated areas over at least some of said openings in said outer panel identifying certain elements of the system illustrated in the layout that have different operating modes, which designated areas are to be illuminated to indicate particular operating nodes of the elements in the layout of the system shown on said outer face of said outer panel.

4,928,206
FOLDABLE PRINTED CIRCUIT BOARD

Warren W. Porter, Escondido, and Donald K. Lauffer, Poway, both of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Nov. 23, 1988, Ser. No. 274,571
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—385 **11 Claims**



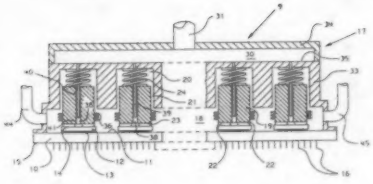
1. A printed circuit apparatus including a container, comprising:
a plurality of rigid printed circuit boards;
a width of each of said plurality of rigid printed circuit boards is less than the maximum transverse extend of said container;
at least two flexible printed circuit panels, each said flexible printed circuit panel is electrically connected to a respective pair of said plurality of rigid printed circuit boards;
said flexible printed circuit panels are folded into alternately opening U-shapes such that said plurality of rigid printed circuit boards are joined in a fan-fold configuration within said container; and
a cryogenic liquid filling a portion of said container and cryogenically cooling a portion of said plurality of rigid circuit boards and each said flexible circuit panel to provide cryogenic cooling to said portion.

4,928,207

CIRCUIT MODULE WITH DIRECT LIQUID COOLING BY A COOLANT FLOWING BETWEEN A HEAT PRODUCING COMPONENT AND THE FACE OF A PISTON

Gregory Chrysler; Richard C. Chu, and Robert E. Simons, all of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 15, 1989, Ser. No. 366,945
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—385 11 Claims



1. A circuit module, comprising:
a substrate having a chip carrying surface;
an array of chips located at chip sites on the chip carrying surface of the substrate;
a hat cooperating with the substrate to form an enclosed space for the chips, the hat comprising supply means for supplying a liquid coolant;
pistons located in the hat above the chip sites, each of the pistons having a bore, therethrough, connected to carry a liquid coolant from the supply means to one of the chips, and each of the pistons further having a lower face, the lower face having a radially symmetrical shape; and
spacer means located on the lower face, for contacting an upper surface of the one of the chips and for forming a gap between the lower face and the upper surface.

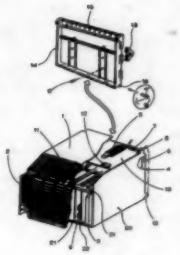
4,928,208

HOUSING AND CONNECTION DEVICE FOR ELECTRONIC MODULES

Fulvio Volpe, Arcofelice Pozzuoli, and Michele Perchiazzi, Napoli, both of Italy, assignors to Selenia Industrie Elettroniche Associate S.p.A., Rome, Italy

PCT No. PCT/IT85/00021, § 371 Date Jun. 23, 1986, § 102(e) Date Jun. 23, 1986, PCT Pub. No. WO86/04207, PCT Pub. Date Jul. 17, 1986
Continuation of Ser. No. 211,105, Jun. 17, 1988, abandoned, which is a continuation of Ser. No. 876,882, May 7, 1986, abandoned. This PCT application Jul. 24, 1985, Ser. No. 317,033
Claims priority, application Italy, Jan. 3, 1985, 35502/85[U]
Int. Cl.[5] H05K 1/14
U.S. Cl. 361—395 6 Claims

1. A housing and connection device for electronic modules comprising:
a fixed panel member having an electrical interface area on one side thereof, and
a movable housing member detachably mounted on the fixed panel member and having openings for heat dissipation,
the movable housing member having a plurality of grooves extending from the interior front to the interior rear thereof for holding a plurality of electronic modules,
the movable housing member also having a first motherboard at the rear disposed perpendicularly to said electronic modules for forming electrical connection therewith, and
the movable housing member also having a second motherboard located above and substantially perpendicular to the first motherboard and electrically connected therewith so as to provide a housing and connection device for a plurality of electronic modules.

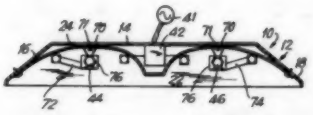


4,928,209

LIGHTING APPARATUS

Bruce W. Rodin, New York, N.Y., assignor to Mirrorlite, Inc., New York, N.Y.

Filed Aug. 31, 1988, Ser. No. 239,173
Int. Cl.[5] F21S 3/00
U.S. Cl. 362—217 21 Claims



1. A device for modifying a lighting apparatus of the type comprising a housing for at least two spaced apart original elongated tubular bulbs disposable in first and second spaced apart elongated spaces within said housing, a pair of spaced apart original sockets, one for each of said bulbs for conducting electricity from an electric source to said bulbs, said original bulbs being supportable in said housing at least in part by their respective original sockets, said modifying device comprising:
a reflector secured to said housing, said reflector defining a third elongated space for a substitute elongated tubular bulb in lieu of said two spaced apart original bulbs,
means for supporting said substitute bulb in said third space, said supporting means being connected to and supported by said reflector;
a substitute socket for said substitute bulb; and
means for electrically connecting said substitute socket to one of said original sockets to energize said substitute bulb by said electric source.

4,928,210

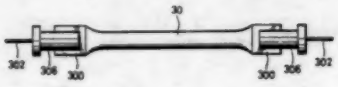
LINEAR LAMP UNIT WITH CONTACTS AT BOTH ENDS

Futomi Hayakawa, and Kazuo Onoda, both of Tokyo, Japan, assignors to Kabushiki Kaisha Hybec, Tokyo, Japan

Continuation of Ser. No. 140,560, Dec. 30, 1987, abandoned. This application Aug. 18, 1989, Ser. No. 396,629
Claims priority, application Japan, May 29, 1987, 62-134037
Int. Cl.[5] H01J 5/50
U.S. Cl. 362—217 6 Claims

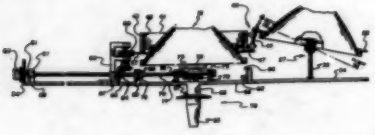
1. In an elongated lamp unit in which electrically conductive connecting terminals provided at both ends of the lamp are electrically connected by force fitting into metal contact clamps arranged opposite each other; the improvement in which said electrically conductive connecting terminals are

flat metal plated embedded in and extending endwise beyond ceramic cylinders secured to flat portions formed on each end of an elongated lamp bulb, said ceramic cylinders having a diameter less than the width of said flat portions, said terminals



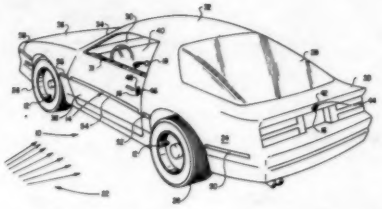
being electrically connected with a filament disposed in the bulb, said terminals having surface-to-surface contact with said metal contact clamps on opposite sides of each of said terminals endwise beyond said flat portions.

4,928,211
LIGHTHEAD ASSEMBLY
Leonard L. Hallings; Donald W. Bramer; Bruce A. Sanborn, all of Rochester, and James E. Schryver, Wayland, all of N.Y., assignors to MDT Corporation, Torrance, Calif.
Filed Mar. 6, 1989, Ser. No. 319,046
Int. Cl.[5] F21V *13/00*
U.S. Cl. 362—33 **23 Claims**



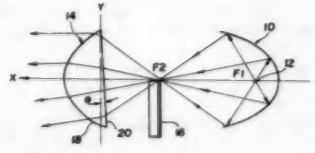
1. A lighthead assembly, comprising a lighthead with:
a central pod, including a lamp, said central pod being mounted within said lighthead and constructed and arranged such that when said lighthead is energized, said pod produces an axial light beam with respect to said lighthead;
a multiplicity of peripheral pods, each including a lamp, said peripheral pods being mounted within said lighthead symmetrically around said central pod on pivot mounts, said peripheral pods being constructed and arranged so that when said lighthead is energized, said peripheral pods produce peripheral light beams originating symmetrically with respect to said axial light beam, said pivot mounts permitting displacement of said peripheral pods within a range of pivotal movement, whereby the peripheral light beams originating from said peripheral pods may be caused to intersect said axial light beam at selected locations corresponding to selected amounts of displacement within said range of movement;
coordination means operably associated with said peripheral pods, constructed and arranged to coordinate the pivotal movement of said peripheral pods so that all of said horizontal light beams simultaneously intersect said axial light beam at any said selected location throughout said range of movement;
said coordination means including a cylindrical surface rotatably mounted within said lighthead about an axis of rotation approximately parallel said axial light beam, said cylindrical surface element carrying camming surface means; and
reaction means, operably associated with each of said peripheral pods and said camming surface means to effect synchronized pivoting of said peripheral pods in a first direction as said cylindrical surface element is rotated clockwise and in a second direction, opposite said first direction, as said cylindrical surface element is rotated counterclockwise;
drive means, mechanically coupled to, and constituting means for rotating, said cylindrical surface element; and
handle structure external said lighthead, mechanically coupled to said drive means and constituting means for actuating said drive means.

4,928,212
PHOSPHORESCENT VEHICLE PART IDENTIFICATION SYSTEM
Butch Benavides, 828 E. Parkerville Rd., DeSoto, Tex. 75115
Filed Nov. 3, 1988, Ser. No. 266,887
Int. Cl.[5] B60Q *1/00*
U.S. Cl. 362—61 **6 Claims**



1. A phosphorescent vehicle part identification accessory comprising an article of molded plastic having formed therewith a phosphorescent compound adapted for glowing for a period of time following exposure to light energy; and means for securing said phosphorescent article to said vehicle in a location thereon for receiving illumination from other vehicles and external light sources in providing a decaying glow therefrom, said phosphorescent article comprising a vehicle wheel valve stem cap.

4,928,213
PROJECTOR-TYPE HEAD LAMP FOR VEHICLES
Yutaka Nakata, Isehara, Japan, assignor to Ichikoh Industries, Ltd., Tokyo, Japan
Filed Jan. 19, 1989, Ser. No. 298,912
Claims priority, application Japan, Jan. 20, 1988, 63-8545
Int. Cl.[5] B60Q *1/00*
U.S. Cl. 362—61 **3 Claims**



1. A projector-type head lamp for use on vehicles, comprising a reflector having an optical axis, a first focus located near said reflector and a second focus located far from said reflector, a light source disposed near said first focus of said reflector, a convergent lens disposed opposite to said reflector with said second focus of the latter located at the intermediate position between them, of which the optical axis is nearly coincident with that of said reflector and which has a focus near said second focus of said reflector, and a shade disposed near said focus of said convergent lens and of which the cut line is located near the optical axis of said convergent lens, said convergent lens comprising an aspherical frontal surface and a substantially flat, continuous back surface which is gradually

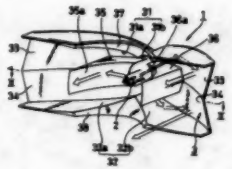
nearer to the focus of said frontal surface as it goes from the upper portion toward the lower portion of said convergent lens, whereby all the color fringes caused by the aberration of said convergent lens appear within the main illuminated zone below the light-dark limit of the light distribution pattern.

4,928,214

VEHICLE FRONT LAMP

Hiroo Oyama, Sagamihara, Japan, assignor to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Sep. 28, 1989, Ser. No. 414,125
Claims priority, application Japan, May 6, 1988, 63-110129
Int. Cl.[5] B60Q *1/04*
U.S. Cl. 362—61 **11 Claims**



1. A vehicle front lamp, comprising:

a light source;

an upper first curved surface made of composite curved surfaces for reflecting a light beam from said light source in the left direction of the vehicle and in the right direction of the vehicle, respectively, said upper first curved surface being mounted at a higher position than said light source;

a lower first curved surface made of composite curved surfaces for reflecting a light beam from said light source in the left direction of the vehicle and in the right direction of the vehicle, respectively, said lower first curved surface being mounted at a lower position than said light source;

an upper second curved surface for reflecting a light beam reflected from said upper first curved surface for making said light beam reflected thereby substantially parallel in the forward direction of the vehicle, said upper second curved surface being formed at the right and left of said light source;

a lower second curved surface for reflecting a light beam reflected from said lower first curved surface for making said light beam reflected thereby substantially parallel in the forward direction of the vehicle, said lower second curved surface being formed at the right and left of said light source;

said composite curved surfaces of said upper first curved surface being slanted by an angle of 10 to 35 degrees so as to direct said light beam reflected thereby downward;

said composite curved surfaces of said lower first curved surface being slanted by an angle of 10 to 35 degrees so as to direct said light beam reflected thereby upward;

said upper second curved surface and said lower second curved surface being in contact relation with each other substantially along a line; and

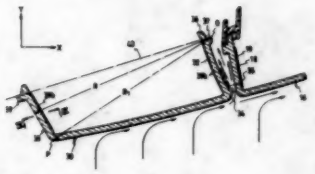
light shielding units mounted at the right and left of said light source along said line defining said contact between said upper and lower second curved surfaces.

4,928,215

VEHICLE LAMP DEVICE

Yuuji Fujino, and Yasuhiro Nakamura, both of Shimoku, Japan, assignors to Koito Manufacturing Co., Ltd., Tokyo, Japan

Filed Mar. 17, 1989, Ser. No. 324,864
Claims priority, application Japan, Mar. 17, 1988, 63-36131[U]; Jul. 15, 1988, 63-176514; Oct. 8, 1988, 63-252918
Int. Cl.[5] B60Q *1/02*
U.S. Cl. 362—61 **5 Claims**



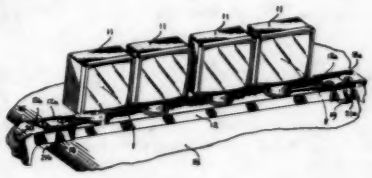
1. A vehicle lamp device comprising: a unit movable rectangular headlamp, and a rectangular vehicle lamp arranged adjacent said unit movable rectangular headlamp with a gap therebetween, each of said lamps having a front lens, at least one of said front lenses having a sidewall which confronts a sidewall of the other of said lamps and which has at least one front edge protruding outwardly toward the other of said front lenses so that the gap between the front lenses of said lamps is narrowed at said at least one front edge.

4,928,216

LIGHT MOUNT ASSEMBLY HAVING RAISED AND LOWERED POSITIONS

Jeff A. Carr, Downey, Calif., assignor to Carr Pattern Co., Inc., South Gate, Calif.

Filed Oct. 30, 1989, Ser. No. 428,859
Int. Cl.[5] B60Q *1/06*; F21V *3/18*
U.S. Cl. 362—66 **8 Claims**



1. An assembly for mounting one or more lights on a vehicle comprising:

a pair of mounting brackets attached to opposite sides of said vehicle, each of said brackets having a stop member extending therefrom;

a bar, said lights being mounted on said bar; and

means for attaching the opposite ends of said bar to said brackets for pivotal adjustment relative thereto between predetermined raised and lowered positions of said lights, said bar having projections on both ends thereof which matingly engage the stop members of the brackets when the bar is in said lowered position.

4,928,217

ADJUSTABLE LAMP

Lawrence L. Laske, 153 Mercer St. - 5th Floor, New York, N.Y. 10013

Continuation-in-part of Ser. No. 212,175, Jun. 27, 1988, Pat. No. 4,847,740, which is a continuation-in-part of Ser. No. 139,617, Dec. 30, 1987, Pat. No. 4,827,390. This application Feb. 10, 1989, Ser. No. 308,634

Int. Cl.[5] F21S *1/12*

U.S. Cl. 362—427 **6 Claims**

1. An adjustable lamp comprising: a base, a top wall of said base having at least one adjustment hole;

at least one lamp bar, each said lamp bar having a lamp end, an opposite pivot end and a support point therebetween, pivot means secured to said base, said opposite pivot end secured to said pivot means;

lighting means secured to said lamp end;

an adjustment bar arm having an adjustment hole end matingly engageable with said at least one adjustment hole, an adjustment bar attached to an adjustment bar end which is opposite said adjustment hole end of said adjustment bar arm, said adjustment bar having a support portion in point contact with said at least one lamp bar at said support point to provide a desired lamp vertical position; and

said pivot means comprising at least one central pivot portion pivotally supported between at least two end fixed portions, each said end fixed portion secured to said base, said opposite pivot end of said at least one lamp bar secured to said central pivot portion, said central pivot portion rotatable with respect to said at least two end fixed portions, an adjustment/assembly screw supported between said at least two end fixed portions, and said central pivot portion lockable with respect to said end fixed portion by tightening said adjustment/assembly screw.

4,928,218

SWITCH MODE POWER SUPPLY START-UP CIRCUIT

James S. Kluttz, Winter Springs, Fla., assignor to NCR Corporation, Dayton, Ohio

Filed Mar. 6, 1989, Ser. No. 319,601

Int. Cl.[5] H02M *5/458, 7/5375*

U.S. Cl. 363—37 **5 Claims**

1. A switch mode power supply comprising:

means for converting an AC input voltage to a DC voltage, including an AC input line and a first positive temperature coefficient thermistor series connected in said line;

a transformer having a primary winding, primary winding output, and secondary winding;

means for generating a series of pulses;

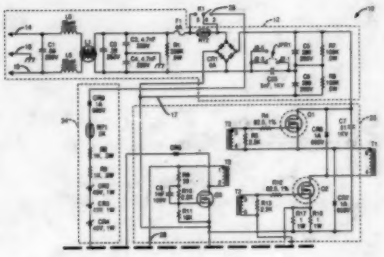
means responsive to said pulses for switching said DC voltage across the primary winding of said transformer;

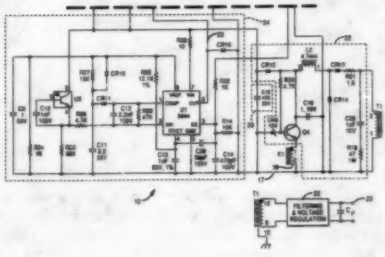
a charge storage device connected to a power input of said pulse generating means, said charge storage device comprising a storage capacitor connected between said start-up circuit and a primary DC return line;

an auxiliary voltage generator connecting the primary winding output of said transformer to said power input of said pulse generating means, said auxiliary voltage generator comprising a transistor and filter, said filter including an inductor connected between said primary winding output and transistor, said transistor and relay coil being series connected between said filter and primary DC voltage return line and said transistor having a control electrode connected through a first resistor to the junction of said filter and transistor;

a start-up circuit connecting said AC input voltage to said charge storage device; and

switch means responsive to the current in said primary





winding output for disconnecting said start-up circuit from said charge storage device, said switch means including a relay having a coil and armature, said armature having a first and second position, wherein said first position series connects said first thermistor with said start-up circuit, wherein said second position short circuits said first thermistor, and wherein said armature assumes said second position in response to a current in said coil.

4,928,219

ADAPTABLE CURRENT REGULATING SYSTEM

Charles J. Roslund, Monroeville, and Bruce M. Cook, Plum Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 29, 1989, Ser. No. 373,077

Int. Cl.[5] H02M *1/18*

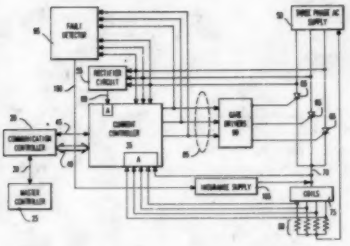
U.S. Cl. 363—54 **4 Claims**

1. An adaptable current regulating system having a status, said system being connectable to receive a supply voltage, and providing a controlled current to a drive control element in accordance with information from a master controller, said system comprising:

communication means for receiving the information, for receiving a first portion of status data and for transmitting the first portion of the status data to the master controller;

control means for monitoring the status and providing the first portion of the status data, for monitoring the received supply voltage, and for generating at least one drive signal varying in accordance with at least some of the information and the monitored supply voltage; and

fault means for monitoring said at least one drive signal and the received supply voltage and for providing a second



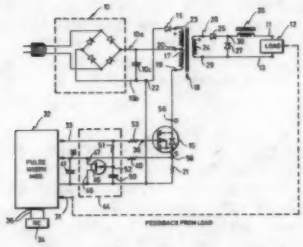
portion of the status data in response to monitoring the at least one drive signal and the received supply voltage.

4,928,220

SWITCHING MODE DC-TO-DC POWER SUPPLY WITH IMPROVED CURRENT SENSING

Alan V. White, Montgomery County, Tex., assignor to Compaq Computer Inc., Houston, Tex.

Filed Oct. 14, 1988, Ser. No. 258,220
Int. Cl.[5] H02H 7/122; H02M 3/335
U.S. Cl. 363—56 **18 Claims**



1. A control circuit, comprising:

a controlled device having a current path and a control terminal;

a pulse generator for applying variable pulses to said control terminal;

sensing means coupled to said current path of the controlled device and producing an electrical indication of operation of said controlled device; said indication being applied to an input of said pulse generartor to vary said pulses;

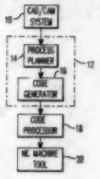
a spike-inhibiting circuit having an input coupled to receive said pulses being applied to said control terminal and having an output coupled to said input of the pulse generator to inhibit said electrical indication from being applied to said input of the pulse generator at the beginning of each of said pulses, said output of said spike-inhibiting circuit including a control transistor having a current path shunting said input of said pulse generator.

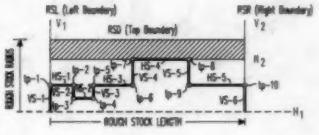
4,928,221

PART PROGRAM GENERATING SYSTEM

Bruno M. Belkhiter, Lewisville, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 11, 1988, Ser. No. 179,685
Int. Cl.[5] G06F 15/00
U.S. Cl. 364—191 **12 Claims**





1. A process for generating a numerical control program from a part drawing, comprising the steps of:

(a) producing a shape signature from the drawing; and

(b) generating the program from the shape signature, comprising the steps of:

(b1) producing a process tree from the shape signature;

(b2) determining boundaries for each node of the process tree;

(b3) determining a machining operation from the boundaries;

(b4) selecting processes based on the shapes defined by the boundaries; and

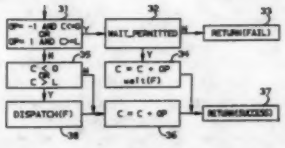
(b5) producing machining program steps based on the processes selected.

4,928,222

ENHANCED SEMAPHORE ARCHITECTURE

John J. Vriezen, Zumbrota, Minn., and Robin N. Niemeyer, Eau Claire, Wis., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,088
Int. Cl.[5] G06F 9/46
U.S. Cl. 364—200 **4 Claims**



S(F,OP, WAIT_PERMITTED) FULLPHORE SIGNAL OPERATION

1. A fullphore for efficiently enforcing mutual exclusion between consumer tasks and producer tasks in a computer system, comprising:

a count for incrementing and decrementing responsive to an operation flag;

a limit imposed on said count; and

a queue for waiting consumer tasks and producer tasks.

4,928,223

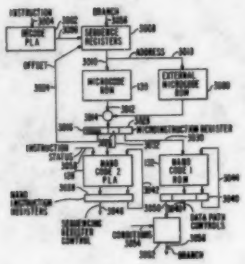
FLOATING POINT MICROPROCESSOR WITH DIRECTABLE TWO LEVEL MICROINSTRUCTIONS

Tich T. Duo, and Gary R. Burke, both of Cupertino, Calif., assignors to Fairchild Semiconductor Corporation, Cupertino, Calif.

Continuation-in-part of Ser. No. 433,059, Oct. 6, 1982, abandoned. This application Aug. 28, 1986, Ser. No. 901,446

Int. Cl.[5] G06F *9/00, 9/22, 9/26, 13/00*

U.S. Cl. 364—200 **7 Claims**



1. A microprocessor comprising:

(a) an instruction sequence register having an instruction address and connected to provide said instruction address to means for storing a first level of instruction;

(b) a first level instruction register connected to receive a first level instruction from said first level instruction storage means;

(c) means for storing a second level of instructions connected to receive an address from said first level instruction register, said second level instruction storage means comprising:

(i) first means for storing a first portion of said second level instruction; and

(ii) separate second means for storing a second portion of said second level instructions,

(d) a first, second level instruction register connected to receive said first portion of said second level instruction; and,

(e) a second, second level instruction register connected to receive said second portion of said second level instructions, wherein said first and second, second level instruction registers are connected to supply instruction portions to said first means for storing a first portion of said second level instructions and said separate second means for storing a second portion of said second level instructions respectively and at least a portion of instructions output from said first, second level instruction register is coupled to an input of said instruction sequence register through branch control means.

4,928,224

MULTIPROCESSOR SYSTEM FEATURING GLOBAL DATA MULTIPLATION

Ferruccio Zulian, Cornaredo, Italy, assignor to Bull HN Information Systems Italia S.p.A., Caluso, Italy

Filed May 19, 1988, Ser. No. 196,651

Claims priority, application Italy, Nov. 17, 1987, 22666 A/87

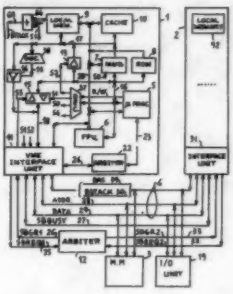
Int. Cl.[5] G06F *15/16*

U.S. Cl. 364—200 **9 Claims**

1. A multiprocessor computing system comprising:

a plurality of processors connected in common to a system bus, each processor comprising a processing unit, a local memory and an interface unit connected in common to an internal bus, and said interface unit connecting said internal bus to said system bus, said local memory of each processor including a plurality of addressable storage locations for storing information, a number of said storage locations used to store global data currently in use by said plurality of processors, said processing unit of each processor being connected to have access to said local memory of each of the other processors through said system bus and corresponding interface units for reading or writing information referenced by an address code, said address code comprising a destination code for identifying said local memory into which said information is to be read or written, said each processor further including:

first means including said processing unit for generating a destination code in said address code having a binary configuration for identifying said information as global data in response to each write command generated by said processing unit for storing said information in said local memory associated therewith; and



second means including said interface unit responsive to said global data binary configuration in said destination code and to said write command from said first means to concurrently perform a write operation of said information identified as a global data into a specified one of said number of storage locations in said local memory associated therewith and broadcast said address code including said global data binary configuration and said write command on said system bus causing all of said other processors to write said information into one of said number of locations of their local memories so that all of said processors are able to have immediate access to said global data.

4,928,225

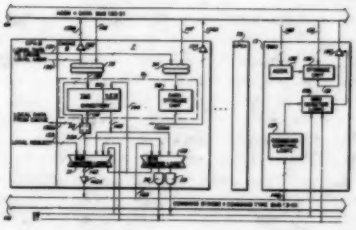
COHERENT CACHE STRUCTURES AND METHODS

Daniel M. McCarthy; Joseph C. Circello; Gabriel R. Munguia, all of Phoenix, and Nicholas J. Richardson, Scottsdale, all of Ariz., assignors to Edgcore Technology, Inc., Scottsdale, Ariz.

Continuation-in-part of Ser. No. 236,449, Aug. 25, 1988. This application Sep. 2, 1988, Ser. No. 240,747

Int. Cl.[5] G06F *12/08, 15/16*

U.S. Cl. 364—200 **32 Claims**



1. A method for maintaining cache coherency in a computer

system including a plurality of processors each having an associated cache memory, a global memory that has an access time greater than that of the cache memories, a bus intercoupling the processors and the global memory, and status conductors connected to each of the processors and to the global memory, the method comprising the steps of:

(a) storing a plurality of blocks of data in the global memory;

(b) storing selected blocks of data, each having a respective address, in various cache memories;

(c) storing with each block of data in the cache memories a plurality of cache coherency status bits associated with that block of data;

(d) sending an address of a requested block of data from a first processor to an associated cache memory;

(e) generating a cache miss signal if that associated cache memory does not include the requested block of data;

(f) sending the address of the requested blocks of data to the bus in response to the cache miss signal;

(g) operating each of the processors, except the first processor, to monitor the address of the requested block of data on the bus;

(h) sending a state which corresponds to the status bits of the requested block of data from a second processor over the status conductors to the first processor;

(i) operating the first processor to read the state of the requested block of data from the status conductors, whereby accessing of the global memory to determine if the global memory is to supply the requested block of data is avoided.

4,928,226

DATA PROCESSOR FOR PARALLELLY EXECUTING CONFLICTING INSTRUCTIONS

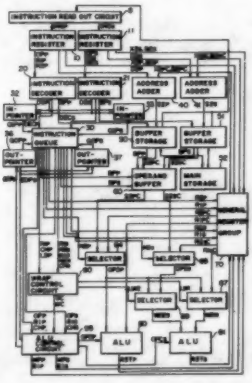
Eiki Kamada; Yooichi Shintani, both of Hadano; Kazunori Kuriyama, Saitama; Tohru Shonai, Hadano, and Kiyoshi Inoue, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 24, 1987, Ser. No. 124,839

Claims priority, application Japan, Nov. 28, 1986, 61-281720

Int. Cl.[5] G06F *9/38, 9/00, 7/38*

U.S. Cl. 364—200 **7 Claims**



1. A data processor for parallelly executing a plurality of instructions in successive operation stage, comprising:

(a) a storage for storing operands;

(b) a group of registers each for storing an operand;

(c) operand storing means for storing operands of a plurality of instructions, said operands being read from said storage thereto;

(d) means for decoding instructions to be executed and providing decode information of at least two instructions, at least one of which is to be subjected to an arithmetic or logical operation;

(e) instruction detection means for detecting, based on said instruction decode information of said at least two instructions supplied from said decode means, that a preceding instruction among said at least two instructions requests reading of an operand from said storage or from said register group and writing of said operand into a register of said register group without performing an arithmetic or logical operation on said operand, and that a succeeding instruction among said at least two instructions requests reading of said operand in said register and performing an arithmetic or logical operation thereon; and

(f) execution means responsive to the detection by said instruction detection means for concurrently performing arithmetic or logical operation stages in the execution of said preceding instruction and said succeeding instruction.

4,928,227

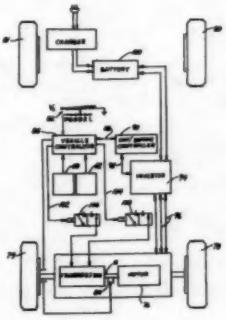
METHOD FOR CONTROLLING A MOTOR VEHICLE POWERTRAIN

Joseph C. Burbo; Ronald G. Landman, both of Ypsilanti; Prabhakar B. Patil, Detroit, and Graydon A. Reitz, Farmington Hills, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 2, 1987, Ser. No. 115,799

Int. Cl.[5] G05D *17/02*; B60K *41/18*; B60L *7/20*

U.S. Cl. 364—424.01 **14 Claims**



1. A method for controlling the operation of a automotive vehicle powertrain system, which includes a power source, a multiple speed ratio transmission, selectively engageable and disengageable friction elements, comprising:

producing signals representing the position of a gear selector located at park P, neutral N, forward drive D and low speed forward drive L positions, the torque TQC commanded, and the speed MS of the power source;

producing an upshift command US and a downshift command DS in accordance with the current operating speed ratio, the speed of the power source and the torque represented by the torque command signal;

changing the state of the system to a first forward speed ratio state from a neutral state by moving the gear selector to a forward drive position;

changing the state of the system from the first speed ratio to the second speed ratio by operating the friction elements to upshift the transmission, provided the upshift command is present and gear selector is in the D position;

changing the state of the system from the second speed ratio state to a second speed regenerative state, provided the torque represented by the torque command signal is negative;

changing the state of the system from the second speed

regenerative state to a first speed regenerative state provided the downshift signal is present or the gear selector is not at the D position; and

changing the state of the system from the first speed regenerative state to the first gear state, provided the gear selector is in the D or L position and the power source speed signal represents substantially zero speed.

4,928,228

APPARATUS FOR DETECTING MISFIRE AND FOR CONTROLLING FUEL INJECTION

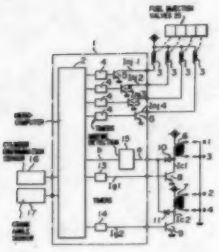
Takanori Fujimoto, and Toshiro Hara, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,427

Claims priority, application Japan, May 26, 1987, 62-130220; May 26, 1987, 62-130219; May 26, 1987, 62-130218; May 26, 1987, 62-130217; May 26, 1987, 62-130216

Int. Cl.[5] F02M *51/00*; F02P *17/00, 11/06*

U.S. Cl. 364—431.09 9 Claims



1. An engine control apparatus which comprises, in combination:

a cylinder discrimination sensor for generating cylinder discriminating signal;

a crank angle sensor for generating crank angle signal;

a fuel injection valve provided in each cylinder of the engine;

a plurality of ignition coils with each and every cylinder being connected to one of said coils;

misfire detection means for detecting a state of misfire due to a lack of an ignition signal from any of said coils in accordance with signals received from said ignition coils, said misfire detection means producing a misfire detection signal which alternately changes between two levels in response to ignition signals during normal operation and which fails to change if a misfire is detected;

an engine control section for controlling said fuel injection valves and said ignition coils in correspondence to the detected misfire upon receipt of the cylinder discrimination signal and the crank angle signal, and for not actuating the fuel injection valve of the misfired cylinder in response to the cylinder discrimination signal upon receipt of the misfire detection signal; and

an OR circuit connected to said ignition coils to detect a misfire state due to a lack of an ignition signal, said OR circuit having an output connected to an input of said misfire detection means.

4,928,229

LABEL PRINTER

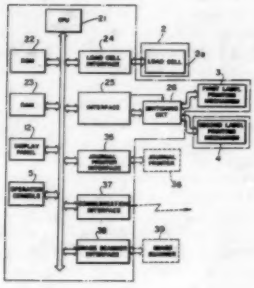
Kazuharu Tersoka; Mitsuo Satake; Toshio Denda; Takashi Katayama, and Shiro Seyasu, all of Tokyo, Japan, assignors to Tersoka Seiko Co., Ltd., Tokyo, Japan

Filed Jan. 29, 1988, Ser. No. 150,521

Claims priority, application Japan, Jan. 30, 1987, 62-20008; May 25, 1987, 62-127339; Sep. 30, 1987, 62-247709

Int. Cl.[5] G01G *23/22*

U.S. Cl. 364—464.01 32 Claims



1. A label printer comprising:

(a) a plurality of label printing mechanisms, each capable of printing data on a label in the form of desired dot patterns; and

(b) a printer control means to which said plurality of label printing mechanisms are connected in parallel, said printer control means selectively controlling the printing operations of said label printing mechanisms.

4,928,230

AUTOMATIC TRANSACTING APPARATUS

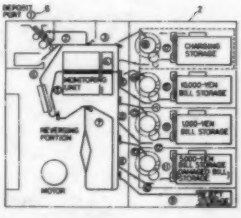
Shigemi Kawamura, and Masahide Yamauchi, both of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed Mar. 23, 1988, Ser. No. 172,163

Claims priority, application Japan, Mar. 23, 1987, 62-68675; Mar. 23, 1987, 62-68676; Apr. 20, 1987, 62-98419; Apr. 20, 1987, 62-98417

Int. Cl.[5] G06F *15/30*

U.S. Cl. 364—479 11 Claims



1. An automatic transacting apparatus, comprising:

a plurality of storage compartments;

transporting means for storing and extracting paper documents into/from said storage compartments;

means for detecting a delivery malfunction of the transporting means when documents have not been transported correctly;

means for indicating the position of the document in the transporting means when a malfunction has occured;

switch means for generating a reset control signal for controlling the operation of said transporting means; and

means for controlling said transporting means such that said transporting means is driven at a low speed after detection of a malfunction of said transporting means when a signal from said switching means is received at said controlling means.

4,928,231

APPARATUS FOR FORMING FLOW-MAP IMAGES USING TWO-DIMENSIONAL SPATIAL FILTERS

Barry F. Hunt, Nashua, N.H.; Alwyn P. D'Sa, Cambridge, and Paul A. Magnin, Andover, both of Mass., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 826,800, Mar. 6, 1986, abandoned. This application May 15, 1989, Ser. No. 352,602

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—518 **4 Claims**

1. Apparatus for producing images of blood flow comprising:

a scanner having transducers for transmitting pulses of pressure waves into a body under examination along radial lines of a sector and means for sampling reflections from reflectors impinging on said transducers so as to derive signals from which the velocities of said reflectors at positions along said radial lines can be determined,

a velocity detector for deriving from said signals data values representing the velocities of reflectors at said positions,

a two dimensional spatial median filter coupled to said velocity detector for selecting from data values at each position and data values surrounding said position a selected data value that is to be used as the data value at said position,

a color cathode ray tube, and

means coupled between said two dimensional median filter and said cathode ray tube for controlling the colors it displays.

4,928,232

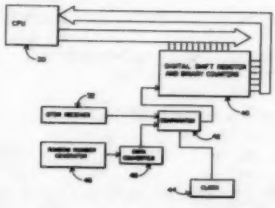
SIGNAL AVERAGING FOR OPTICAL TIME DOMAIN RELECTOMETERS

John R. Gentile, Frankfort, N.Y., assignor to Laser Precision Corporation, Utica, N.Y.

Filed Dec. 16, 1988, Ser. No. 285,026

Int. Cl.[5] G01M *11/00*

U.S. Cl. 364—525 **9 Claims**



9. In an optical time domain reflectometer which includes (a) a laser for firing signals into a fiber strand, (b) means for receiving and measuring continuously varying returning signals representing reflection values during a waveform sweep along the fiber strand, and (c) a computer controller, a method for extracting useful waveform-determining values from the noise in which they are embedded, comprising:

directing to the first input of a comparator an analog voltage signal representing the values returning from the fiber strand during a given waveform sweep;

directing to the second input of the comparator an analog voltage signal selected from a large number of signal values which are substantially evenly distributed in the range of possible values;

maintaining the same signal at the second input of the comparator during one complete waveform sweep;

outputting from the comparator at clocked intervals a digital signal indicating which of its input signals is instantaneously higher;

storing each digital signal from the comparator in a different storage register stage;

clocking the comparator output signals and the storage register stage inputs at a frequency which provides the desired waveform resolution;

transferring the signal stored in each register stage to a separate counter at the end of a waveform sweep;

changing the signal at the second input of the comparator;

repeating during the next waveform sweep the steps taken during the previous waveform sweep;

adding the values from successive sweeps into the respective counters; and

repeating the foregoing process the number of times needed to obtain a desired signal-to-noise ratio in the recorded waveform.

4,928,233

SYSTEM FOR PROVIDING THREE DIMENSIONAL OBJECT DESCRIPTIONS

David B. Millis, Friendsville, Pa., assignor to International Business Machines, Armonk, N.Y.

Filed Aug. 24, 1987, Ser. No. 88,925

Int. Cl.[5] G06F *15/62*

U.S. Cl. 364—522 **16 Claims**

1. A system for producing human readable physical data in text form from geometric data in mathematical form that partially describes a three dimensional object comprising:

(a) a first database comprising said geometric data in mathematical form representative of the shape of the three dimensional object;

(b) a second database comprising said physical data in text form;

(c) means for extracting at least a portion of said data from said first database, calculating physical data in mathematical form therefrom and converting said calculated data into human readable physical data in text form; and

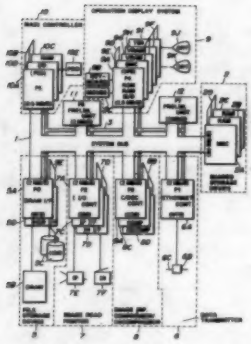
(d) means for combining said calculated human readable physical data with said data from said second database to produce a comprehensive physical and geometric description in text form of said object.

4,928,234

DATA PROCESSOR SYSTEM AND METHOD

Yoshio Kitamura, Kanagawa; Hiroshi Takizaka, Tokyo, and Tadao Ishihara, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 807,544, Dec. 11, 1985, abandoned.
This application Nov. 1, 1988, Ser. No. 266,256
Claims priority, application Japan, Dec. 24, 1984, 59-280817
Int. Cl.[5] G06F 9/00
U.S. Cl. 364—200 19 Claims



1. A data processing system of the type having a system bus, including a bus clock, one or more data input means for inputting data, display means for displaying inputted data and processed data, storage means for storing the input data and the processed data, and shared storage means connected to each of the above means through the system bus, the system processing data as designated by the data input means, wherein the system comprises

(a) a plurailty of memory bank means, each of which is connected to the system bus and which together constitute the shared storage means;

(b) a plurality of separate processor means provided for each of the data input means, the display means and the data storage means, respectively, for separately processing data for each of them, each of the separate processor means being connected to the system bus and being capable of generating a memory request command signal on the system bus for the purpose of transferring data between itself and any one of the memory bank means;

(c) arbitration means within the shared storage means which is responsive to a memory request command signal generated by one of the processor means for generating separate enable signals to acknowledge occupation of one of the memory bank means by the one processor means which generated the memory request; and

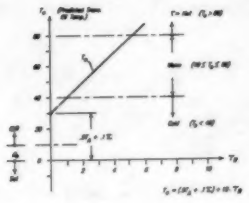
(d) data dividing means for dividing data transferred between the one processor means and the one memory bank means into predetermined groupings of divisional data and for processing each divisional data in synchronization with the bus clock of the system bus and in simultaneous parallel fashion when a plurality of memory requests are out-putted simultaneously from a plurality of the processor means.

4,928,235

METHOD OF DETERMINING THE FLUID TEMPERATURE OF AN ELECTRONIC AUTOMATIC TRANSMISSION SYSTEM

Hemang S. Mehta, Sterling Heights; Gerald L. Holbrook, Rochester Hills, and Maurice B. Leising, Clawson, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 187,771
Int. Cl.[5] G06F 15/20; B60K 41/08
U.S. Cl. 364—424.1 4 Claims



1. In a vehicle transmission system including an input member, an output member, a torque converter assembly for transmitting torque between an engine and the input member, a gear assembly for changing the ratio of torque between the input member and output member, a plurality of frictional units for shifting the gear assembly, a fluid actuating device being moveable axially for applying at least one frictional unit, at least one solenoid-actuated valve being moveable in response to the presence or absence of electrical power to the valve for directing fluid flow between a fluid source and the fluid actuating device, sensors providing signals indicative of measurement data for predetermined conditions, a controller for processing the signals and providing signals to control the solenoid-actuated valves, a method of determining the fluid temperature of the transmission, said method comprising the steps of:

reading a sensor by the controller for the ambient temperature of the engine;

multiplying the engine temperature by a first predetermined value;

reading the temperature of the ambient air surroundings;

multiplying the ambient temperature by a second predetermined value;

adding the multiplied engine temperature and multiplied ambient temperature together;

measuring a time period once the transmission is not in a predetermined gear and the speed of the engine is greater than a predetermined speed;

multiplying the measured time period by a third predetermined value;

summing the multiplied measured time period and the added value of temperature to obtain a value of transmission fluid temperature;

determining the transmission fluid temperature based on the value of transmission fluid temperature; and

controlling the operation of the transmission based on the determined transmission fluid temperature.

4,928,236

DISPLAY METHOD IN AN INFERENCE TRACE OF AN EXPERT SYSTEM

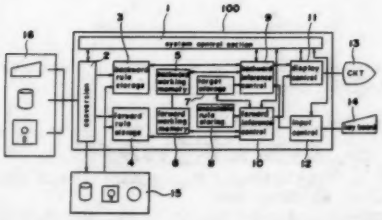
Toshiyuki Tanaka, Yamatokoriyama; Shigeki Kuga, Nara; Nobuo Nakamura, Yamatokoriyama; Taro Morishita, and Masahiro Wada, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 19, 1988, Ser. No. 221,348

Claims priority, application Japan, Jul. 22, 1987, 62-184122

Int. Cl.[5] G06F *15/18*

U.S. Cl. 364—513 **11 Claims**



1. A method for displaying a trace of a rule for forward inference control in an expert system comprising the steps of:

(a) displaying information indicating an addition of a fact to the working memory;

(b) determining the condition of a match between the rule and the added fact;

(c) determining if condition of negation is satisfied if the condition in step (b) is affirmative;

(d) displaying information indicating that the rule is executable if the condition of negation is satisfied.

4,928,237

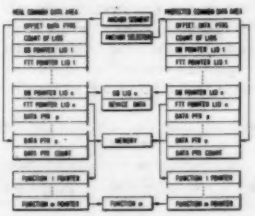
COMPUTER SYSTEM HAVING MODE INDEPENDENT ADDRESSING

Richard Bealkowski, Delray Beach; Richard A. Dayan, Boca Raton; David J. Doria, Boca Raton; Scott G. Kinnear, Boca Raton; Jeffrey I. Krantz, Boca Raton, all of Fla.; Robert B. Liverman, Raleigh, N.C.; Guy G. Sotomayor, West Palm Beach, Fla.; Donald D. Williams, and Gary A. Vaiskauckas, both of Boca Raton, Fla., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Mar. 27, 1987, Ser. No. 30,789

Int. Cl.[5] G06F *9/00*

U.S. Cl. 364—200 **14 Claims**



7. A personal computer system comprising:

a central processing unit comprised of a microprocessor operating in either one of a first or a second mutually incompatible addressing mode;

a memory coupled to the central processing unit for storing information, said memory being addressable by said processing unit in either one of said first and second addressing modes;

means for addressing said memory, said addressing means cooperating with said central processing unit for controlling the presentation of addressing information to said central processing unit in said first and second addressing modes,

said addressing means further comprising first and second tables for the first and second modes respectively, each table including pointers to predetermined respective regions of said memory, wherein at least some of said pointers in said first table having corresponding pointers in said second table

a first anchor pointer directing said central processing unit to said first tables whenever said central processing unit is in the first addressing mode; and

a second anchor pointer directing said central processing unit to the second tables whenever said central processing unit is in the second addressing mode;

whereby said central processing unit may be directed to address the same location in said memory in either addressing mode without said central processing unit switching address modes.

4,928,238

SCALAR DATA ARITHMETIC CONTROL SYSTEM FOR VECTOR ARITHMETIC PROCESSOR

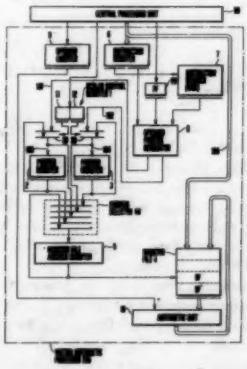
Sunao Sekiguchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 2, 1987, Ser. No. 69,102

Claims priority, application Japan, Jul. 4, 1986, 61-158221

Int. Cl.[5] G06I *15/347, 15/16, 12/00*

U.S. Cl. 364—200 **4 Claims**



1. A scalar data arithmetic control system for a vector arithmetic processor for performing vector arithmetic operations independently of a central processing unit under the control of said central processing unit, said vector arithmetic processor comprising:

a register file for storing an operand supplied from said central processing unit when a vector operation instruction is to be executed;

pointer register means for storing and outputting to said register file address data for said operand stored in said register file;

an operand counter for counting operands supplied from said central processing unit to said register file, a count of said operand counter being incremented when said operand is loaded in said register file and decremented when said vector operation instruction is executed; and

a scalar control register for storing a value representing whether said operand is a scalar or vector operand, said value being determined by said central processing unit on the basis of said vector operation instruction and supplied therefrom to said scalar control register; said pointer

register means being coupled to said scalar control register; wherein

when said value stored in said scalar control register is representative of an operand being scalar, second and subsequent cycles of the arithmetic operations are performed using same address data outputted from said pointer register means for said operand as that used in a first cycle of the arithmetic operations so as to perform scalar arithmetic operations, and said central processing unit sets only said operand counter in place of loading of said operand in said register file.

4,928,239

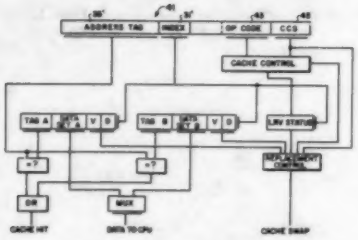
CACHE MEMORY WITH VARIABLE FETCH AND REPLACEMENT SCHEMES

Allen Baum, Palo Alto; William R. Bryg, Saratoga; Michael J. Mahon, San Jose; Ruby B. Lee, Cupertino, and Steven S. Muchnick, San Francisco, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 879,649, Jun. 27, 1986, abandoned. This application May 26, 1989, Ser. No. 358,460

Int. Cl.[5] G06F *9/32*

U.S. Cl. 364—200 **8 Claims**



1. A method for selecting for replacement data blocks in a cache memory of a computer system at a time when a new data block is retrieved from a main memory of the computing system wherein the computer system comprises a processor for fetching and executing data, the main memory, and the cache memory, the method comprising:

presenting an instruction from the processor to the cache memory, said instruction including a cache control specifier indicative of a type of data structure included in the cache memory;

selecting one of a plurality of replacement schemes for swapping a data block from cache memory, said selected replacement scheme being selected based on a value of said cache control specifier; and

swapping a data block from cache memory in accordance with said selected replacement scheme when a new data block is retrieved from the main memory of the computing system.

4,928,240

ACTIVE CLEARANCE CONTROL

Samuel H. Davison, Loveland; Kevin H. Kast, Cincinnati, and Aidan W. Clark, Blue Ash, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Feb. 24, 1988, Ser. No. 160,052

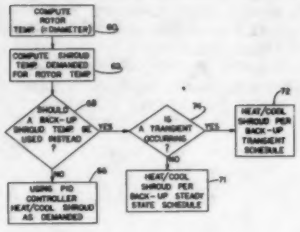
Int. Cl.[5] F01D *11/00*

U.S. Cl. 364—431.02 **47 Claims**

2. A method of controlling tip clearance in a turbine in a gas turbine engine, comprising the following steps:

(a) ascertaining turbine rotor temperature;

(b) computing a demanded shroud temperature in response to the rotor temperature; and



(c) adjusting actual shroud temperature in response to the demanded shroud temperature.

4,928,241

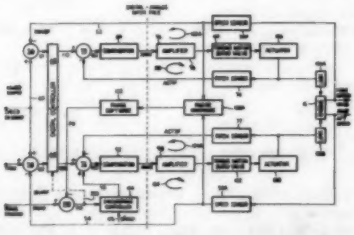
AIRCRAFT PROPELLER CONTROL

Stanley G. Day, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 737,972, May 28, 1985, abandoned. This application Sep. 14, 1987, Ser. No. 96,283

Int. Cl.[5] B64C *11/50*

U.S. Cl. 364—424.01 **6 Claims**



6. A control for aft and fore aircraft propellers which rotate in opposite directions about a common axis, comprising:

(a) a fore speed sensor for producing a fore speed signal indicative of the speed of the fore propeller;

(b) an aft speed sensor for producing an aft speed signal indicative of the speed of the aft propeller;

(c) a fore pitch sensor for producing a fore pitch signal indicative of the pitch of the fore propeller;

(d) an aft pitch sensor for producing an aft pitch signal indicative of the pitch of the aft propeller;

(e) a phase sensor for producing a phase signal indicative of the phase angle between the two propellers;

(f) a fore pitch actuator for changing the pitch of the fore propeller;

(g) an aft pitch actuator for changing the pitch of the aft propeller;

(h) means for comparing the fore and aft speed signals with a demanded speed signal and for producing fore and aft speed error signals;

(i) means for processing the fore and aft speed error signals and for providing processed fore and aft speed error signals indicative of a fore and aft pitch angle correction required to adjust the speed of the respective fore and aft propellers;

(j) means for comparing the fore and aft speed error signals with the respective fore and aft pitch signals and producing fore and aft pitch error signals;

(k) means for changing the respective pitches of the fore and

aft propellers in response to the respective pitch error signals of (j);

(l) means for comparing the phase signal with a demanded phase signal and for producing a phase error signal; and

(m) means for modifying the aft processed speed error signal of (i) in response to the phase error signal.

4,928,242

VEHICLE SPEED SENSOR ABNORMALITY DETECTION DEVICE

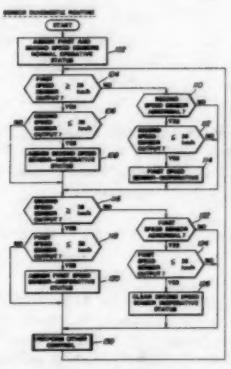
Yutaka Suzuki, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed May 26, 1988, Ser. No. 200,126

Claims priority, application Japan, May 28, 1987, 62-79952[U]

Int. Cl.[5] G01M *19/00*

U.S. Cl. 364—424.03 **10 Claims**



1. In a system

a first sensor for sensing the magnitude of a first operational parameter;

a second sensor for sensing said magnitude of said first operational parameter;

a control circuit which receives the outputs of said first and second sensors and which produces a control signal, said control circuit including means for diagnosing the normality of said first and second sensors, said diagnosing means including circuitry for:

comparing the output of said first sensor with a predetermined value;

comparing the output of said second sensor with said predetermined value;

indicating that said second sensor is malfunctioning in the event that the output of said first sensor is above said predetermined value and the output of said second sensor is below said predetermined value; and

indicating that said first sensor is malfunctioning in the event that the output of said first sensor is below said predetermined value and the output of said second sensor is above said predetermined value.

4,928,243

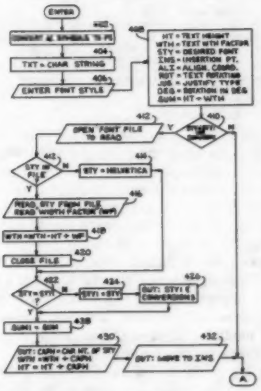
METHOD AND SYSTEM FOR PRINTING GRAPHICS AND TEXT FROM VECTOR-BASED COMPUTER AIDED SOURCE INFORMATION

William L. Hodges, Prairie Village, and Patrick J. Cheek, Shawnee Mission, both of Kans., assignors to Preco Industries, Inc., Lenexa, Kans.

Filed Oct. 6, 1987, Ser. No. 106,543

Int. Cl.[5] G05F *3/12*

U.S. Cl. 364—519 **11 Claims**



1. In a system for converting entity descriptions in vector notation of drawing components making up a plot wherein said entity description includes plotting data and the identity of entity type such as arc, text, or the like into a format for use by an image creation device such as an electrostatic printer, laser printer, or the like for creating an image of the plot, a method of operating the system for converting the entity descriptions in vector notation into entity descriptions in device notations, such as page description language, said method comprising the steps of:

selecting an entity description for conversion;

identifying the type of the entity described in the selected entity description;

converting the plotting data in vector notation of the selected entity description into corresponding plotting data in device notation according to the type of entity described in the selected entity description; and

producing signals for output representative of said entity description in device notation including signals representative of said entity type and said corresponding plotting data for use by said image creation device in creating an image of the drawing entity corresponding to said selected entity description according to said corresponding plotting data;

the image creation device further including means for producing an image of said selected entity at a selected gray scale level according to said corresponding plotting data, said method further including the steps of entering signals representative of a selected gray scale level of said selected entity, and

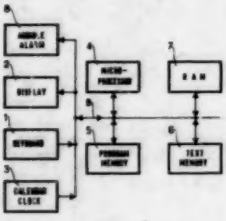
including said gray scale level in said corresponding plotting data.

4,928,244

ELECTRONIC FRANKING MACHINE INCLUDING FRANKING LIMIT VALUES

Bernard Vermeuse, L'Hay-les-Roses, France, assignor to Societe Anonyme dite : SMH Alcatel, Paris, France

Filed Feb. 29, 1988, Ser. No. 161,949
Claims priority, application France, Feb. 27, 1987, 87 02669
Int. Cl.[5] G07B *17/00*
U.S. Cl. 364—464.02 **9 Claims**



1. A franking machine comprising a keyboard, a display, a calendar clock, a microprocessor, a program memory, a text memory, and a working memory connected to a bus, a first set of messages for normal franking operations and a second set of messages for special operations being stored in the text memory, the program memory containing programs relating to each message in the first and second sets of messages, the second set of messages being accessible from a Menu key on the keyboard, depressing said Menu key causing a beginning-of-menu first message to appear, said first message comprising options each identified by a different digit corresponding to a different digit key on the keyboard, wherein:

said beginning-of-menu first message includes an option for fixing a franking limit value in order to prevent any franking operation at a higher value, said operation being identified by a digit;

the second set of messages includes a change of limit value message which appears after selecting the option for fixing the limit value, in order to receive a limit value from the keyboard; and

the first set of messages includes a "franking limit exceeded" message which appears whenever a franking value is confirmed which is greater than the limit value contained in the working memory, said franking limit exceeded message prohibiting franking.

4,928,245

AUTOMATED CARTRIDGE SYSTEM

Michael E. Moy, Lafayette; Kelly J. Beavers, Boulder; Stuart W. Bray, Louisville; Frank A. Goodknight, Boulder; Paul Kunnil, Boulder; Eugene Kutasy, Boulder; Raymond L. Lacchesi; Frederick G. Munro, both of Broomfield; Richard G. Selike, Denver, and Thomas J. Studebaker, Boulder, all of Colo., assignors to Storage Technology Corporation, Louisville, Colo.

Division of Ser. No. 7,047, Jan. 27, 1987, Pat. No. 4,864,511.
This application Aug. 24, 1989, Ser. No. 398,280
Int. Cl.[5] G11B *15/00, 23/00*
U.S. Cl. 364—513 **15 Claims**

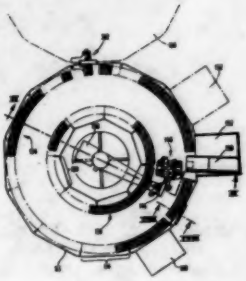
1. In a data storage and retrieval subsystem of a data processing system, the subsystem including a library storage module for storing a plurality of magnetic tape cartridges in a pair of substantially cylindrical arrays disposed concentrically about a vertical axis, a robot for transferring the cartridges comprising:

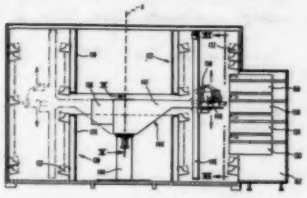
an arm mounted for rotation about the vertical axis;

means, attached to the end of said arm, for raising and lowering the cartridges parallel to the vertical axis;

a turntable mounted for rotation upon said raising and lowering means;

a pair of hands mounted for extension and retraction in an opposed relationship upon said turntable, said hands being adapted for rotation about their axes of extension and restraction; means for rotating said turntable; and means for rotating said hands;





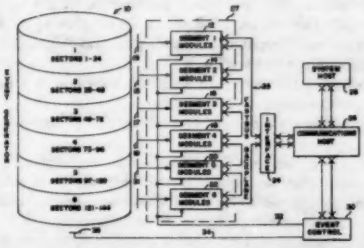
wherein each of said arms, said means for raising and lowering the cartridges, said turntable, said hands, and said rotating means act independently one from the other thereby minimizing diagnostic control.

4,928,246

MULTIPLE CHANNEL DATA ACQUISITION SYSTEM

H. Bert Crawley; Eli I. Rosenberg; W. Thomas Meyer; Mark S. Gorbics, all of Ames; William D. Thomas, Boone; Roy L. McKay, and John F. Homer, Jr., both of Ames, all of Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Oct. 21, 1988, Ser. No. 261,031
Int. Cl.[5] G06K *15/00*; H04J *3/00*
U.S. Cl. 364—514 **30 Claims**



1. A multiple channel data acquisition system for converting analog signals from a multiplicity of data channels into digital

data samples and for transferring the data samples to a host processor, said data acquisition system comprising:

a plurality of data acquisition modules, each including a local processor means, module memory means, channel conversion means, front end buffer (FEB) means, and communications coupling means;

a high speed communication pathway which couples each communications coupling means of a respective module to the host processor;

each of said data acquisition modules further including a module bus for coupling said FEB means, said module memory means, said local processor means, and said communication coupling means, said module bus adapted for bidirectional communications between said FEB means and said module memory means, said FEB means and said communications coupling means, or said module memory means and said communications coupling means;

said channel conversion means including means for periodically converting the analog signals from at least one of said data channels into the data samples, cache memory means, means for storing the data samples in said cache memory means, and means for periodically transferring the data samples stored in said cache memory means to said FEB means;

wherein said host processor controls communications between said communications coupling means and said module memory means or said FEB means; and

wherein said local processor controls communications between said module memory means and said FEB means or said communications coupling means.

4,928,247

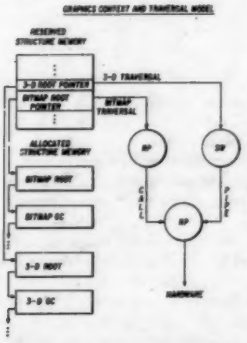
METHOD AND APPARATUS FOR THE CONTINUOUS AND ASYNCHRONOUS TRAVERSAL AND PROCESSING OF GRAPHICS DATA STRUCTURES

Peter L. Doyle, Northboro; John P. Ellenberger, Groton; Ellis O. Jones, Andover; David C. Carver, Medway; Steven D. DiPirro, Holliston; Branko J. Gerovac, Marlboro, all of Mass.; William P. Armstrong; Ellen S. Gibson, both of Salt Lake City, Utah; Raymond E. Shapiro, Marlboro, Mass.; Kevin C. Rushforth, West Valley City, and William C. Roach, Salt Lake City, both of Utah, assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 85,081, Aug. 13, 1987. This application Apr. 20, 1988, Ser. No. 184,108

Int. Cl.[5] G06F *3/14*

U.S. Cl. 364—518 **12 Claims**



1. A method of operating a computer graphics system comprising the steps of:

(a) providing a plurality of application processes in a host central processing unit;

(b) operating said host central processing unit to execute said application processes to thereby generate individual graphics data structures relating to said application processes, each of said individual graphics data structures containing graphics data and commands representative of an object to be displayed by said computer graphics system;

(c) further operating said host central processing unit to store said individual graphics data structures in a memory device;

(d) operating a graphics device to continuously and asynchronously traverse said memory device through at least a portion of each of said individual graphics data structures to identify a sequence of certain ones of said individual graphics data structures and to asynchronously read and transmit said graphics data and commands of said certain ones of said individual graphics data structures, in accordance with said sequence, to a graphics subsystem for processing, manipulation and display; and

(e) identifying, ordering and setting said sequence of said certain ones of said individual graphics data structures by cooperatively operating said graphics device and said host central processing unit through further execution of said application processes to:

(i) selectively generate and control separate traversal requests, each of said separate traversal requests containing information on the mode and type of traversal of a preselected one of said certain ones of said individual graphics data structures;

(ii) attach each of said generated traversal requests to the respective preselected one of said certain ones of said individual graphics data structures; and

(iii) read and execute each of said traversal requests during the continuous and asynchronous traversal of said memory device to provide graphics processing of a multiple of application processes.

4,928,248

LIGHT SOURCE DRIVING DEVICE

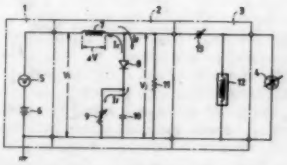
Akira Takahashi, and Musubu Koishi, both of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed May 3, 1989, Ser. No. 347,375

Claims priority, application Japan, May 7, 1988, 63-110750

Int. Cl.[5] H01S *3/097*

U.S. Cl. 372—38 **6 Claims**



1. A light source driving device, for driving a light source comprising:

an input voltage generating section for superposing a pulse voltage on a predetermined DC voltage to provide an input voltage;

a voltage converting section having inductor means and a step recovery diode; and

a driving section having delay means,

said voltage converting section applying said input voltage through said inductor means to said step recovery diode, to provide a very short pulse voltage,

said driving section for applying said very short pulse voltage to the light source, and said delay means for delaying said very short pulse voltage, inverting the polarity

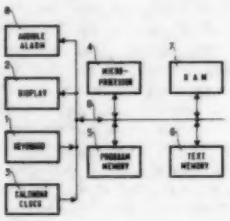
thereof, and applying said inverted very short pulse voltage to the light source.

4,928,249

OPERATING SYSTEM FOR AN ELECTRONIC FRANKING MACHINE

Bernard Vermeese, l'Hay-les-Roses, France, assignor to Societe Anonyme dite : SMH Alcatel, Paris, France

Filed Feb. 29, 1988, Ser. No. 161,948
Claims priority, application France, Feb. 27, 1987, 87 02667
Int. Cl.[5] G07B *17/00*
U.S. Cl. 364—518 **12 Claims**



1. A franking machine comprising a keyboard including ten digit keys, a display, a calendar clock, a microprocessor, a program memory, a text memory, and a working memory interconnected by a bus, wherein:

the display is suitable for displaying a text of L lines of N alphanumeric characters;

the keyboard further includes an Enter key, a Cancel key, a Star key, and a Menu key;

a first set of messages for normal franking operations and a second set of messages for special operations are stored in the text memory;

the second set of messages is accessible by means of the Menu key;

each message in the first and second sets of messages is split into screens each comprising a number L of lines and N of alphanumeric characters equal to the number L of lines and N of characters that can be displayed by the display, with the screens of a message being displayed in succession;

each screen is fully displayed on the display after being transferred from the text memory into the working memory; and

the program memory contains as many programs as there are messages, with each program relating to one of the messages. with a message being displayed by running the corresponding program, with the first set of messages guiding an operator by indicating the next operation to be performed until a franking operation is achieved, and with the second set of messages guiding the operator in performing any special operation by means of messages each of which consists in a sequence of options which, on being selected, lead to corresponding other messages, and so on until the special operation is achieved.

4,928,250

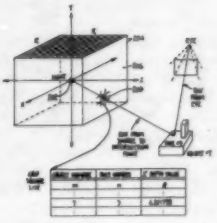
SYSTEM FOR DERIVING RADIATION IMAGES

Donald P. Greenberg; Michael F. Cohen, and Eric A. Haines, all of Ithaca, N.Y., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 2, 1986, Ser. No. 881,067
Int. Cl.[5] G06F *15/66*
U.S. Cl. 364—518 **53 Claims**

20. A method for defining the radiation data between a surface and a radiation source in an environment, said method comprising:

defining a polyhedron enclosing said radiation source and defining grid cells on one or more planes of the polyhedron; and



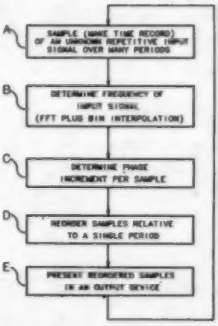
projecting an image of said surfaces onto the polyhedron in the direction of the radiation source and determining which grid cells are enclosed by or in contact with the image.

4,928,251

METHOD AND APPARATUS FOR WAVEFORM RECONSTRUCTION FOR SAMPLED DATA SYSTEM

Michael S. Marzalek, Petaluma; Stephen R. Peterson, Santa Rosa, both of Calif., and John A. Wendler, Urbana, Ill., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 27, 1987, Ser. No. 43,070
Int. Cl.[5] G01R *23/02*
U.S. Cl. 364—484 **12 Claims**


A
SAMPLE (MAKE TIME RECORD) OF AN UNKNOWN REPETITIVE INPUT SIGNAL OVER MANY PERIODS
B
DETERMINE FREQUENCY OF INPUT SIGNAL (FFT PLUS BIN INTERPOLATION)
C
DETERMINE PHASE INCREMENT PER SAMPLE
D
REORDER SAMPLES RELATIVE TO A SINGLE PERIOD
E
PRESENT REORDERED SAMPLES IN AN OUTPUT DEVICE

1. A signal analysis method for a repetitive input signal comprising the steps of:

generating a clock signal;

sampling said repetitive input signal in accordance with said clock signal without reference to triggering indicia of said repetitive input signal in order to obtain signal representations;

determining the fundamental frequency of said repetitive input signal from said signal representations;

determining phase information for each of said signal representations relative to a reference phase of said repetitive input signal;

sorting said signal representations according to phase relative to said reference phase of said repetitive input signal to obtain sorted signal representations; and

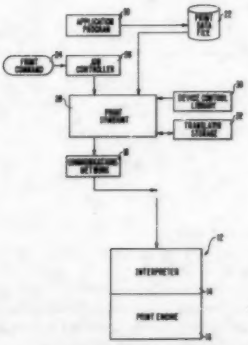
presenting said sorted signal representations to an output device relative to said reference phase thereby to reconstruct an image of said signal waveform.

4,928,252

PRINTING APPARATUS AND METHOD FOR PRINTING A PLURALITY OF PAGES ONTO A SINGLE SHEET

David Gabbe, Hudson, and Ned Batchelder, Brookline, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Feb. 24, 1988, Ser. No. 159,947
Int. Cl.[5] G06F 3/12
U.S. Cl. 364—519 12 Claims



12. An apparatus for printing a plurality of pages on a single sheet comprising:

means for generating pages in a page description format;

means for transmitting a print request;

means, coupled to said transmitting means, for scheduling said transmitted print request;

means, responsive to said print request and data representing said pages in a page description format, for printing said pages on a sheet;

means, coupled to said generating means, for storing said pages in response to said generating means,

means, coupled to said printing means, said scheduling means, and said storing means, for determining at least one grid configuration, each of said grid configurations defining a plurality of grid areas for printing pages therein, for calculating scale factors to establish the size of a page to be printed from one of said page descriptions to fit in one of said grid areas in each of said grid configurations, and for determining one of said grid configurations having a percent coverage of surface area of said sheet greater than a predetermined percentage;

means, coupled to said means for determining at least one grid configuration, for generating instructions for printing the plurality of pages in corresponding grid areas of said grid configuration having a percent coverage of surface area of said sheet greater than a predetermined percentage; and

said printing means including means for interpreting said instructions and for printing a plurality of pages on the single sheet in response to said interpreting means.

4,928,253

CONSECUTIVE IMAGE PROCESSING SYSTEM

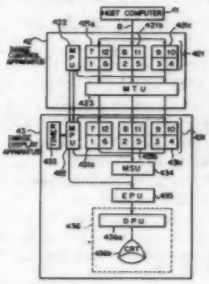
Junichi Yamauchi; Kimiko Maejima; Kaoru Eguchi, and Noriko Kobayama, all of Yokohama, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 21, 1987, Ser. No. 5,776
Claims priority, application Japan, Jan. 25, 1986, 61-14444; Jan. 25, 1986, 61-14443; Jan. 25, 1986, 61-14442
Int. Cl.[5] G09G 1/28
U.S. Cl. 364—521 10 Claims

1. A consecutive image processing system for smoothly and consecutively processing image data when transferring and displaying said image data stored in image memories and display memories, said system comprising:

a host computer;

an image control means for controlling a display of images, having a plurality of image memories divided into a plurality of memory areas for storing image frames having a display order, said display order being applied to allow performance of a display based on either a memory switch or an address switch so that the memory switch and address switch are not performed simultaneously, and a first microprocessor unit for commanding an enlargement rate,



a memory transfer, and a display start based on a command from said host computer; and

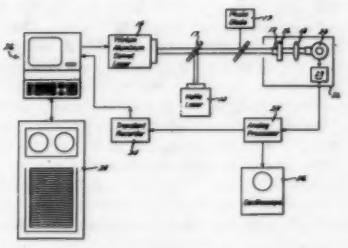
an image display means for displaying images, having a plurality of display memories each divided into a plurality of memory areas corresponding to said image memories for storing image frames to be displayed, each image frame having a display order corresponding to said image memories, and a second microprocessor unit for commanding a memory switch and a start address of an enlarged image under said enlargement rate based on a command from said first microprocessor unit.

4,928,254

LASER FLASH THERMAL CONDUCTIVITY APPARATUS AND METHOD

Arne K. Knudsen, 4007 Oak Ct.; Scott H. Delzer, 5316 Russell St., and Charles A. Langhoff, 1601 Clover La., all of Midland, Mich. 48640

Filed Apr. 28, 1988, Ser. No. 187,372
Int. Cl.[5] G06F 15/20; G01N 25/20
U.S. Cl. 364—556 8 Claims



1. A method of ascertaining the thermal diffusivity of a sample comprising:

applying a plurality of discrete temporally-spaced radiant energy pulses to a first portion of said sample, each of said radiant energy pulses having a peak power below the level

at which damage to said sample occurs, each of said radiant energy pulses causing a discrete temperature rise pulse to propagate through said sample to a second portion of said sample;

sensing said temperature rise pulses at said second portion and electrically recording said sensed temperature rise pulses as data in a two-state memory device wherein each discrete temperature rise pulse corresponds to a discrete datum;

statistically processing said data to derive a set of favored values indicative of the temperature of said second portion as a function of time; and

further processing said set of favored values to determined the thermal diffusivity of said sample.

4,928,255

METHOD AND APPARATUS FOR EXPLOSION PROTECTION OF PLANTS, PIPELINES AND THE LIKE BY PRESSURE MONITORING

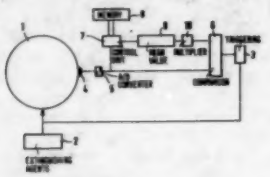
Hermann Brennecke, Darmstadt; Horst Liers, Eppertshausen, and Reinhold Koch, Bad Konig, all of Fed. Rep. of Germany, assignors to IRS Industrie Rationalisierungs Systeme GmbH, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 20,000, Feb. 27, 1987, abandoned. This application May 9, 1989, Ser. No. 332,667

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1986, 3607141

Int. Cl.[5] G08B *17/00*; G06F *11/30*

U.S. Cl. 364—558 **27 Claims**



17. An automatic system for automatically copying with an emergency situation in plant facilities, pipelines and the like wherein a system reference variable is continuously updated to a value which is higher than a prevailing means system parameter value by a safety margin, said system comprising:

sensor means for monitoring successive system parameter values of said system in selected areas, said sensor means being connected to an analog/digital converter arranged to supply signals representing said monitored system parameter values to a control unit and to a comparison means, said control unit supplying at least some of said system parameter values to a memory means for retention in memory and further supplying the monitored system parameter values fed to said memory means to a mean value forming means for calculating a mean value from values fed thereto over a time interval, said means value forming means being connected to a means value incrementing means arranged to increase each said means value supplied to it by said safety margin to create a reference variable, said mean value incrementing means being arranged to supply said reference variable to said comparison means for comparison with said monitored successive system parameter values, said comparison means sending a trigger signal to a triggering means to activate said triggering means upon a monitored system parameter value exceeding said reference variable, and said triggering means automatically producing a signal which is directed to said means for initiating protective provisions for coping with said emergency situation.

4,928,256

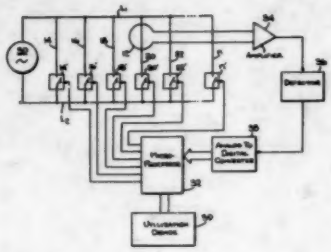
DIGITIZER FOR POSITION SENSING

James A. Parnell, and Dan R. Poole, both of Austin, Tex., assignors to Ametek, Inc., New York, N.Y.

Filed Mar. 16, 1988, Ser. No. 168,984

Int. Cl.[5] G08C *21/00*; G01B *7/14, 7/30*

U.S. Cl. 364—561 **40 Claims**



31. An apparatus comprising:

(a) a planar pad having spaced conductors arranged along orthogonal axes thereof;

(b) a pointer capable of being moved along said planar pad;

(c) energizing means to produce responses which form a response curve dependent upon the distance between said pointer and said spaced conductors; and

(d) a control system including a microprocessor having means for controlling said energizing means and means for determining the distance of said pointer from a conductor previously determined to be nearest said pointer by performing, for each axis, the steps of:

(i) selecting a group of said spaced conductors including said conductor nearest said pointer;

(ii) measuring the responses for each conductor of said group;

(iii) mathematically fitting the measured responses to a function of the form

$$Y_i = C_1 f(x_i + C_2) + C_4 g(x_i + C_2) + C_3$$

which represents the response Y_i *for a conductor at coordinate* x_i, where $f(x)$ is an amplitude term for said pointer having a gain coefficient C_1, $g(x)$ is a tilt term having a tilt coefficient C_4, C_2 is the distance from said pointer to said nearest of said spaced conductors and C_3 represents an offset term, said fitting being performed by a least-squares technique to determine values of C_1, C_2, C_3 and C_4 which fit said measured responses for said group, said value of C_2 determined thereby corresponding to the distance of said pointer from said nearest conductor.

40. An apparatus comprising:

(a) a planar pad having spaced conductors arranged along orthogonal axes thereof;

(b) a pointer movable relative to said planar pad;

(c) energizing means to produce responses which form a response curve dependent upon the tilt angle and distance between said pointer and said spaced conductors; and

(d) a control system including a microprocessor having means for controlling said energizing means, and means for determining said positional coordinate and tilt angle of said pointer, for each axis as it is moved along said planar pad, by the steps of:

(i) storing information functionally related to the characteristic shape of said response curve;

(ii) measuring responses produced when said pointer is at an unknown positional coordinate and tilt angle relative to said planar pad;

(iii) mathematically fitting said measured responses to a

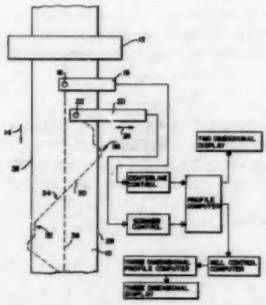
functional expression which includes parameters representing said positional coordinate and tilt angle to determine therefrom values for said parameters.

4,928,257

METHOD AND APPARATUS FOR MONITORING THE THICKNESS PROFILE OF A STRIP

James E. Yerkes, and Theodore H. Lethen, both of Valparaiso, Ind., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Jan. 25, 1988, Ser. No. 147,895
Int. Cl.[5] G01B 15/02, 15/04
U.S. Cl. 364—563 **20 Claims**



1. The method of monitoring the thickness of longitudinally moving strip material to permit quick detection of continuous defects, comprising the steps of:

(a) scanning a strip a predetermined number of times at a plurality of sites across the strip and thereby generating a plurality of data sets with each set indicative of the thickness of the strip across the width thereof:

(b) smoothing the scans by combining the data sets and thereby generating a profile;

(c) displaying the generated profile in a two dimensional format; and,

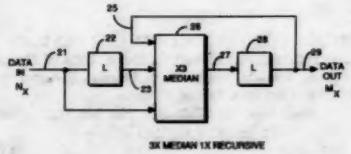
(d) repeating steps a through c thereby continuously displaying a plurality of profiles in sequential relation so that the displayed profiles assume a three dimensional format and a continuous defect, upon the occurrence thereof, will be displayed from one profile to at least an immediately subsequent profile.

4,928,258

RECURSIVE MEDIAN FILTERING

Roger A. May, Winter Park, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 8, 1989, Ser. No. 349,558
Int. Cl.[5] G06F 15/31
U.S. Cl. 364—724.17 **9 Claims**



3X MEDIAN 1X RECURSIVE

1. A recursive median filter comprising:

a source of data in the form of samples, with each sample having a value representing a signal level;

a selection unit having a given number of input ports and one output port, with each input port adapted to receive one sample of data, the input ports being divided into a first set comprising at least two input ports and a second set comprising at least one input port, logic means in the selection unit for comparing the values of the samples at the input ports and for selecting a median sample value and supplying said median sample value to the output port;

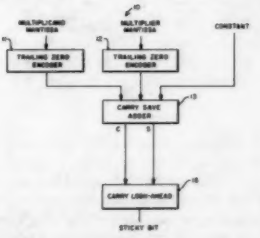
input means coupling said source to said input ports of the first set to supply neighboring samples to said input ports, recursive means coupling the output port to said input port(s) of the second set to provide recursive sample(s).

4,928,259

STICKY BIT PREDICTOR FOR FLOATING-POINT MULTIPLICATION

David Galbi, Mountain View, and Les Kohn, San Jose, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Sep. 23, 1988, Ser. No. 248,740
Int. Cl.[5] G06F 7/38, 7/52
U.S. Cl. 364—745 **10 Claims**



1. A circuit for predicting a sticky bit value when multiplying two numbers comprising:

a first trailing zero encoder for determining a number of trailing zeros in a first operand mantissa;

a second trailing zero encoder for determining a number of trailing zeros in a second operand mantissa;

an adder coupled to receive outputs of said first and second trailing zero encoders and providing a sum of said outputs to determine total number of trailing zeros in both said operand mantissas;

a comparing means coupled to said adder for determining if said sum is greater than a predetermined number, wherein determining said sticky bit value.

4,928,260

CONTENT ADDRESSABLE MEMORY ARRAY WITH PRIORITY ENCODER

Patrick T. Chuang; Robert L. Yau, both of Cupertino; Hiroshi Yoshida, Santa Clara, and Moon-Yee Wang, Cupertino, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed May 11, 1988, Ser. No. 193,315
Int. Cl.[5] G11C 15/00
U.S. Cl. 365—49 **6 Claims**

1. A content addressable memory system comprising:

a plurality of memory cells arranged in rows and columns in an array of N bit words by M word cells;

a plurality of word lines extending through said array for addressing different words in said memory cells each of said words comprising a plurality of adjacent ones of said cells extending in a first direction in said array;

a plurality of match lines extending through said array in parallel with said word lines in said first direction;

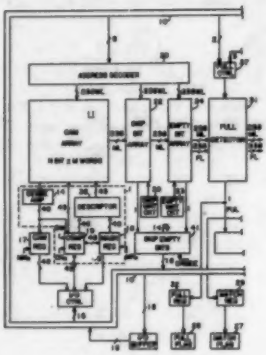
a plurality of bit lines extending through said array in a second direction perpendicular to said first direction, each of said bit lines communicating with said cells in one column of said cells extending through said array in said second direction;

means for storing bits in selected ones of said memory cells in said array;

an input/output (I/O) bus;

means for supplying on said I/O bus a match word to be compared with one or more of said M words in said array;

comparing means for simultaneously comparing the bits of said match word with the bits of two or more of said M words in said array;



match detecting means associated with each bit of said M words in said array for detecting a match condition between said bits in said match word and said bits in two or more of said M words in said array;

means for masking selectable ones of said match conditions to produce one or more unmasked match word conditions;

full detecting means associated with said memory system for detecting an empty word condition or a full condition in said array; and

priority encoder means responsive to said match detecting means and said full detecting means for providing array address indications for said one or more unmasked match word conditions in said array and for providing array address indications for empty word locations in said array.

4,928,261

CMOS READ-ONLY MEMORY WITH STATIC OPERATION

Chinh Nguyen, Vimercate, Italy, assignor to SGS-Thomson Microelectronics SRL, Italy

Filed Sep. 16, 1988, Ser. No. 245,655

Claims priority, application Italy, Oct. 20, 1987, 22339 A/87

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—104 **4 Claims**

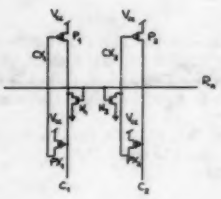
1. A CMOS read-only memory comprising in combination,

at least one individually activatable row and a plurality of main columns crossing said row and defining a plurality of cross-points, each said column of said plurality of main columns being connected to a supply voltage through a respective first pull-up transistor;

a first pull-down cell placed at a first cross-point of said plurality of cross-points and controlled by said at least one row;

a second pull-down cell placed at a second cross-point of said plurality of cross-points and controlled by said at least one row; and

a plurality of auxiliary columns, each auxiliary column associated with a respective main column and connected to the supply voltage through a respective second pull-up transistor, the respective gate of each said second pull-up transistor, the respective gate of each said second pull-up



transistor being connected to a respective main column and the respective gate of each said first pull-up transistor being connected to a respective auxiliary column.

4,928,262

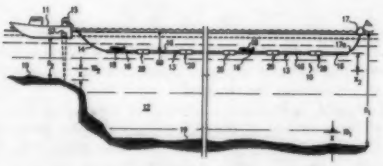
MARINE SEISMIC STREAMER RETRIEVAL SYSTEM

Walter P. Neeley, Irving, and Sammie F. Ritter, Roanoke, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 9, 1988, Ser. No. 269,049

Int. Cl.[5] G01V *1/38*

U.S. Cl. 367—106 **24 Claims**



1. A marine seismic streamer system comprising:

a marine seismic streamer;

a vessel for towing said streamer through a body of water;

at least one streamer recovery unit connected into said streamer, said unit comprising:

a housing;

a source of compressed gas positioned in said housing and having an outlet;

a valve for closing and opening said outlet;

an inflatable, flotation device stored in said housing;

means for connecting said valve to said flotation device;

means aboard said vessel for generating a trigger depth signal which is representative of the depth at which said flotation device is to be inflated;

means in said housing for continuously receiving and storing said trigger depth signal through said streamer;

means for continuously measuring the operating depth of said streamer; and

means for opening said valve when said operating depth equals or exceeds the depth represented by said last received and stored trigger depth signal.

4,928,263

HYDROPHONES AND SIMILAR DEVICES

Bruce A. Armstrong, and Robert G. Dunn, both of Dartmouth, Nova Scotia, Canada, assignors to Hermes Electronics Limited, Dartmouth, Nova Scotia, Canada

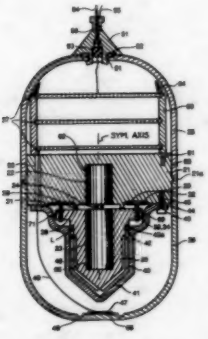
Filed Feb. 10, 1989, Ser. No. 308,512

Int. Cl.[5] G01S *3/80*

U.S. Cl. 367—118 **23 Claims**

1. A direction finding, motion-sensitive transducer, comprising:

(a) an inertial mass;
(b) means defining a mounting base;
(c) resilient means interconnecting said inertial mass with said mounting base, said inertial mass extending along a symmetry axis when at rest in a non-accelerated condition, and said resilient means being adapted to permit the inertial mass to wobble relative to the mounting base in radial directions relative to said symmetry axis in response to and in accordance with the direction of components of acceleration of the mounting base which are transverse to the symmetry axis;



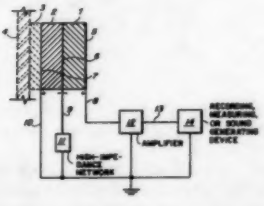
(d) a plurality of sensing elements arranged to respond to the wobbling motion of the inertial mass relative to the mounting base, with said sensing elements being located so as to define multiple directional channels which are adapted to produce outputs dependent on the directions of said acceleration components, and wherein
(e) said inertial mass, said resilient means and said sensing elements together define resonant systems, and damping means common to said inertial mass, said resilient means, said sensing elements and the multiple directional channels defined by the latter for controlling the resonance of said systems.

4,928,264

NOISE-SUPPRESSING HYDROPHONES

Manfred Kahn, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 30, 1989, Ser. No. 373,979
Int. Cl.[5] H04R *17/00*
U.S. Cl. 367—141 **12 Claims**



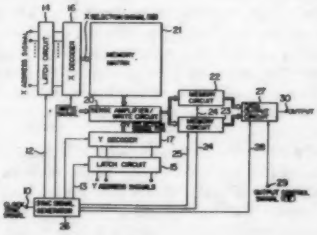
1. A hydrophone system having a hydrophone mounted under water on the outside of the hull of a ship, and associated apparatus on board ship, for detecting acoustic sound signals transmitted under water, said hydrophone system comprising:
a flat solid transducer having one of its flat surfaces affixed on a mounting structure fastened to the hull, and having piezoelectric sensitivity to noise generated by the ship and transmitted to the transducer through said mounting structure, said flat solid transducer generating a first voltage signal proportional to the piezoelectric sensitivity of said flat solid transducer to said mount-transmitted ship noise;
a flat void-containing transducer having one of its flat surfaces in contact with the other surface of the solid transducer, said void-containing transducer having piezoelectric sensitivity to both mount-transmitted ship noise and to hydrostatic acoustic signals, said flat void-containing transducer generating a second voltage signal proportional to the piezoelectric sensitivity of said flat void-containing transducer to both said mount-transmitted ship noise and said hydrostatic acoustic signals;
a first electrode disposed on an outer surface of the void-containing transducer, a second electrode interposed between the void-containing transducer and the solid transducer, and a third electrode disposed on the surface of the solid transducer facing toward the hull of the ship, said first voltage signal appearing between said second and third electrodes and said second voltage signal appearing between said first and second electrodes; and
detecting means on board ship electrically connected to said electrodes and being responsive to said voltage signals generated in response to mount-transmitted ship noise and to acoustic signals for generating electrical representations of sound signals relatively free of mount-transmitted ship noise.

4,928,265

SEMICONDUCTOR INTEGRATED CIRCUIT

Hisayuki Higuchi, Kokubunji; Noriyuki Homma, Kodaira; Makoto Suzuki, Niiza, and Suguru Tachibana, Hachioji, all of Japan, assignors to Hitachi, Ltd., Kyo, Japan

Filed Nov. 2, 1988, Ser. No. 266,148
Claims priority, application Japan, Nov. 2, 1987, 62-275812; Jan. 22, 1988, 63-10624; Mar. 11, 1988, 63-56145; Mar. 11, 1988, 63-56147
Int. Cl.[5] G11C *11/40*
U.S. Cl. 365—189.01 **9 Claims**



1. A semiconductor integrated circuit comprising:
(1) a memory matrix including a plurality of memory cells;
(2) address means for selecting at least one of said plurality of memory cells of said memory matrix in response to an address signal;
(3) a sense amplifier for amplifying a signal from said at least one selected memory cell;
(4) a first memory circuit having an input connected to the output of said sense amplifier;
(5) a second memory circuit having an input connected to the output of said sense amplifier; and
(6) a signal generator for generating a first control signal and a second control signal in response to changes in said address signal,
wherein the timing of said first control signal is set to be different from the timing of said second control signal,

wherein said first memory circuit fetches the output of said sense amplifier in response to said first control signal, and

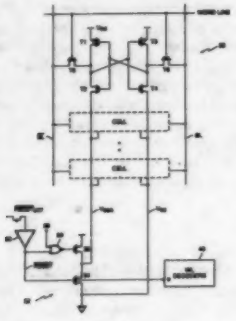
wherein said second memory circuit fetches the output of said sense amplifier in response to said second control signal.

4,928,266

STATIC RAM WITH HIGH SPEED, LOW POWER RESET

Robert A. Abbott, Lake Oswego, Oreg.; Bruce Barbara, Dublin, and Richard S. Roy, Pleasanton, both of Calif., assignors to Vitic, Inc., San Jose, Calif.

Filed May 26, 1988, Ser. No. 199,010
Int. Cl.[5] G11C 7/00
U.S. Cl. 365—189.01 **6 Claims**



1. In a static memory device comprising an array of static memory cells, each memory cell having first and second cross-coupled inverters, the improvement comprising: power voltage connections to said memory cells including distinct power voltage connections to said first and second inverters of each said memory cell; and

reset means, coupled to said power voltage connections and responsive to a reset signal, for generating a voltage imbalance on said power voltage connections in response to said reset signal so that distinct voltage levels are applied to said first and second cross-coupled inverters of each memory cell, said voltage imbalance causing all of said memory cells in said array to be set into a predetermined state;

said static memory device including a multiplicity of bit lines for conveying data values stored in said memory cells, and a multiplicity of word lines for enabling the conveyance of data values for corresponding memory cells to corresponding ones of said bit lines; said reset means including means for disabling said multiplicity of word lines in response to said reset signal so that said memory cells are isolated from said bit lines while said memory cells are set to said predetermined state.

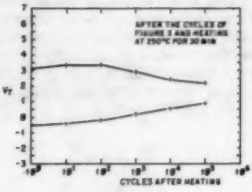
4,928,267

METHOD OF RECONDITIONING AN ELECTRONICALLY PROGRAMMABLE MEMORY DEVICE

David A. Baglee, and Ronald N. Parker, both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 16, 1985, Ser. No. 776,715
Int. Cl.[5] G11C 7/00
U.S. Cl. 365—218 **6 Claims**

1. A method of reconditioning an electrically programmable semiconductor read only memory cell after it has been subjected to a plurality of write and erase cycles resulting in narrowing of its Write/Erase window, comprising:



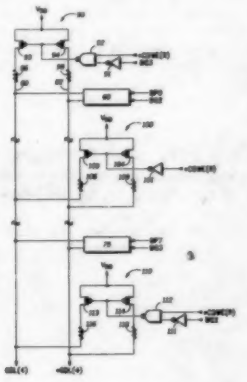
heating the cell to a temperature sufficiently high and for a sufficient length of time to re-open said Write/Erase window.

4,928,268

MEMORY USING DISTRIBUTED DATA LINE LOADING

Scott G. Nogle; Perry H. Pelley, III; Stephen T. Flannagan, and Bruce E. Engles, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 21, 1989, Ser. No. 342,160
Int. Cl.[5] G11C 8/00
U.S. Cl. 365—230.03 **14 Claims**



1. A memory having a top and a bottom, comprising:

a pair of global data lines running from the top of the memory to the bottom;

an array set consisting of a plurality of arrays, including a first array and a last array, distributed along the length of the global data lines of said memory, said arrays having a top and a bottom, said arrays providing a pair of complementary signals to the global data lines when selected;

array selection means, coupled to the plurality of arrays, for selecting an array from the set of arrays;

at least three loads, coupled to the pair of global data lines, distributed substantially evenly along said pair of global data lines.

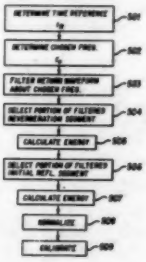
4,928,269
DETERMINING IMPEDANCE OF MATERIAL BEHIND A CASING IN A BOREHOLE

Christopher V. Kimball, West Redding; Fred E. Stanke, Ridgefield, both of Conn.; Curtis J. Randall, Missouri City, Tex., and Andrew J. Hayman, Voisins-le-Bretonneux, France, assignors to Schlumberger Technology Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 264,468, Oct. 28, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 368,065

Int. Cl.[5] G01V *1/40*

U.S. Cl. 367—35 67 Claims



1. A method of calculating an impedance signal related to an acoustic impedance of material behind a section of casing in a borehole, said borehole traversing subsurface earth formations, said method analyzing a return waveform obtained from an acoustic investigation of the section of casing with an acoustic excitation pulse directed thereto, the bandwidth of said pulse selected to stimulate a thickness resonance of the casing, said return waveform including a reverberation segment and an initial reflection segment, said method comprising the steps of:

determining the frequency of said thickness resonance from said return waveform,

determining a time reference indicative of the time of arrival of said return waveform,

filtering said reverberation segment in a predetermined band about said determined thickness resonance frequency, the bandwidth of said predetermined band based on said determined frequency and substantially excluding other thickness resonances;

time windowing a portion of said filtered reverberation segment based on said time reference and said determined frequency; and

calculating an integrated, amplitude-related measure of said windowed reverberation segment to produce an impedance signal.

4,928,270
DIGITAL TIMER WITH CONSTANT RESOLUTION

André Chovin, Crest, and Jacques Taillebois, Bourg Les Valence, both of France, assignors to Crouzet, Montrouge, France

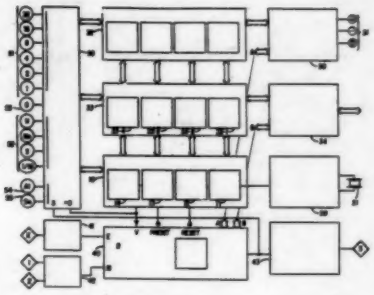
Filed Jun. 20, 1989, Ser. No. 368,814

Claims priority, application France, Jun. 27, 1988, 88 08718

Int. Cl.[5] G04F *8/00*; G04C *19/00*

U.S. Cl. 368—82 5 Claims

1. A digital timer with constant resolution, comprising a clock and a chain of binary down-counters each of which corresponds to a time range which is a multiple of that of the preceding down-counter, wherein the binary outputs of said binary down-counters are fed in parallel to display points of a first set of display points, enabling means being provided so that only the output of the most significant down-counter not at zero actuates the display points, and a display point of a second set of display points is associated with each down-counter so that only the display point corresponding to the most significant down-counter not at zero is actuated.



4,928,271
HOLDER FOR DISCS OF DIFFERENT DIAMETERS

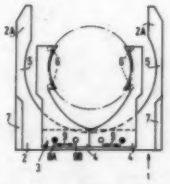
Johannes P. C. M. Verhagen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 27, 1988, Ser. No. 199,985

Claims priority, application Netherlands, Jun. 10, 1987, 8701345

Int. Cl.[5] G11B *23/02*

U.S. Cl. 369—292 11 Claims



1. A holder intended for holding a disc, comprising at least two opposed holding elements (5) comprising holding means (6) constructed to engage a disc at its edge inside the holder (1), at least one of said holding elements (5) being arranged on an actuating element (4) to allow said holding element to be moved out of a holding position, by actuation of the actuating element, to receive or release the disc, characterized in that the movable holding element (5) is adjustable to at least two holding positions relative to a facing holding element (5) in order to hold discs of substantially different diameters.

4,928,272
TWO-WAY CATV SYSTEM USING FREQUENCY DIVISION MULTIPLEXING

Hiroshi Ohue, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 18, 1989, Ser. No. 353,559

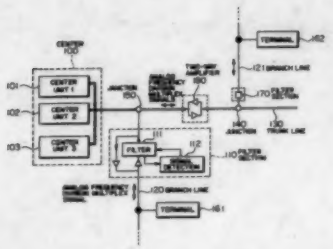
Claims priority, application Japan, May 23, 1988, 63-125248; Jul. 18, 1988, 63-178605

Int. Cl.[5] H04J *4/00*

U.S. Cl. 370—50 9 Claims

1. A two-way CATV system having a plurality of communication channels set simultaneously by using frequency division multiplexing in an upstream communication line from a plurality of terminals to a center, wherein said communication line includes a trunk line connected to the center and branch lines

branching from the trunk line, said CATV system further comprises filter means including a first digital transmultiplexer for converting a frequency division multiplex signal from the terminals into a time division multiplex signal and means for



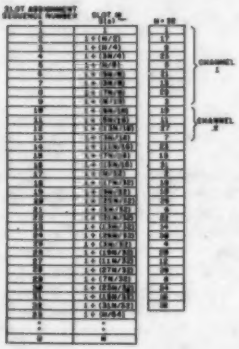
sending into the trunk line only a time slot corresponding to a frequency slot containing a signal, after converting the frequency division multiplex signal from the terminals into the time division multiplex signal through said first digital transmultiplexer.

4,928,273

TIME DIVISION MULTIPLEXER/DEMULTIPLEXER WITH DETERMINISTIC TIME SLOT ASSIGNMENT

Dimitrios Protopapas, Huntington, Conn., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Feb. 21, 1989, Ser. No. 313,005
Int. Cl.[5] H04J 3/16
U.S. Cl. 370—85.7 **22 Claims**



1. Slot assignment apparatus for generating a slot assignment sequence in successive iterations I, where I is initially equal to 1, for a TDM frame having N slots with respective slot numbers #1, #2, #3, . . . ,#N in increasing time order and wherein said slots assigned in said sequence are allocatable to channels carried on said frame, said channels requiring predetermined numbers, respectively, of said assigned slots, comprising:

initial assignment means for assigning slot #1 as the first slot in said sequence,

further assignment means operative during each said iteration for adding $N/2^I$ to said slot numbers of all previously assigned slots to generate further slot assignments in said sequence,

iteration incrementing means for increasing I by 1 during each said iteration,

iteration control means for performing said successive iterations so as to generate said slot assignment sequence, and

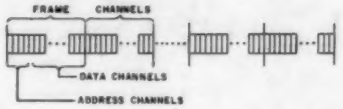
channel allocating means for allocating said predetermined numbers of assigned slots to said channels, respectively.

4,928,274

MULTIPLEXED ADDRESS CONTROL IN A TDM COMMUNICATION SYSTEM

Klein S. Gilhousen, San Diego, and Franklin P. Antonio, Del Mar, both of Calif., assignors to Qualcomm, Inc., San Diego, Calif.

Filed Jan. 19, 1988, Ser. No. 144,905
Int. Cl.[5] H04J 3/24
U.S. Cl. 370—92 **21 Claims**



1. A communication system for sending messages from central communication stations to one or more of a plurality of mobile receivers through Earth orbital relay stations using Time Division Multiplexed communication signals, comprising:

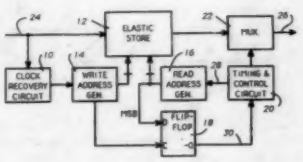
at least one central communication station having transmission means for transmitting a TDM communication signal which comprises a series of N channels, with D data channels, for $D<N$, used exclusively for transmission of message data and A address channels, where $A=N-D$, used for transmission of address information in the form of receiver addresses for receivers designated to receive messages from said station and corresponding ones of said D channels on which said receiver message is transmitted.

4,928,275

SYNCHRONIZATION OF ASYNCHRONOUS DATA SIGNALS

Thomas E. Moore, Edmonton; James A. McEachern, Kanata, and Mark S. Wight, Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed May 26, 1989, Ser. No. 357,244
Int. Cl.[5] H04J 3/07
U.S. Cl. 370—102 **8 Claims**



1. A method of synchronizing an asynchronous signal to produce a synchronized signal by stuffing the asynchronous signal in dependence upon a stuff request signal produced from a comparison with a threshold level of a phase difference between read and write phases with which the synchronized and asynchronous signals are respectively read from and written into a store, wherein a read address for the store is determined in synchronism with a time division multiplex frame of the synchronized signal, and the phase difference is determined at a time synchronized to a write clock for the store.

4,928,276

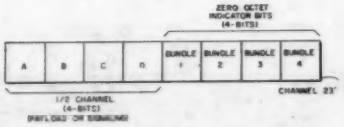
T1 LINE FORMAT FOR ROBBED SIGNALING FOR USE WITH CCITT 32K BIT PER SECOND ADPCM CLEAR CHANNEL TRANSMISSION AND 64KBPS CLEAR CHANNEL TRANSMISSION

Ernest E. Blondeau, Jr., Phoenix, Ariz., and Stephen J. Czarnecki, Carlsbad, Calif., assignors to AG Communication Systems Corporation, Phoenix, Ariz.

Continuation-in-part of Ser. No. 902,823, Sep. 2, 1986, abandoned. This application Oct. 20, 1988, Ser. No. 260,100

Int. Cl.[5] H04J *3/12*

U.S. Cl. 370—110.1 **14 Claims**



1. In a data transmission system having first and a second digital switching systems connected via T1 line transmission facilities, a means for generating a T1 line format for transmitting robbed signaling data from said first digital switching system via said T1 line transmission facilities, said means for generating a T1 line format comprising:

a T1 data frame, said T1 data frame including a predetermined number of data channels for transmitting data between said first and second digital switching systems;

each T1 data frame further including:

a predetermined number of clear data channels;

at least one channel for transmitting signaling data and non-clear channel data between said first and second digital switching systems said non-clear channel data providing information indicating whether a corresponding data channel contains an absence of data;

said channel being operated to transmit said signaling data and said non-clear channel data for a plurality of said clear data channels; and,

said means for generating a T1 line format further comprising:

a plurality of said T1 data frames, each including said plurality of signaling data and said non-clear channel data, and said plurality of said T1 data frames being operated to provide said signaling data and said non-clear channel data to said second digital switching system by providing a uniform portion of said signaling data and said non-clear channel data during each of said T1 data frames.

4,928,277

METHOD AND APPARATUS FOR DRIVING LASER BEAM SOURCE TO AVOID DROOP EFFECTS

Hisayoshi Monma, and Atsushi Suganuma, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 14, 1988, Ser. No. 206,398

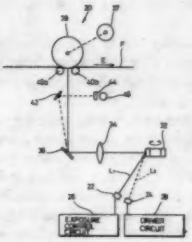
Claims priority, application Japan, Jun. 18, 1987, 62-151759

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—116 **8 Claims**

1. A method of driving a laser beam source to emit a laser beam for use in scanning an image recording medium in order to record image formation on said image recording medium in a plurality of exposure areas, said exposure areas being spaced at intervals in a scanning direction in which said image recording medium is scanned by said laser beam, said method comprising the step of:

supplying a bias current to a laser beam source when a scanning position of said laser beam source is a predetermined distance ahead of an exposure starting position for at least one area to be exposed.



4,928,278

IC TEST SYSTEM

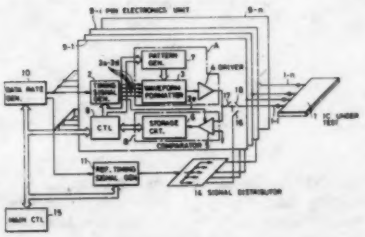
Taiichi Otsuji, Ebina, and Naoaki Narumi, Isehara, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 229,780

Claims priority, application Japan, Aug. 10, 1987, 62-198247; Sep. 22, 1987, 62-237981

Int. Cl.[5] G01R *31/28*

U.S. Cl. 371—1 **26 Claims**



21. An IC test system for testing an IC device by supplying a test signal pattern to said IC device through the input/output pins of said IC device and by receiving output signals from said IC device through said input/output pins, comprising:

(a) clock means for generating clocks;

(B) a main controller for controlling said IC test system;

(C) common timing signal generating means for generating a common timing signal in response to the clock from said clock means;

(D) a plurality of timing adjusting means; each assigned to each of said input/output pins, and for adjusting timing of said common timing signal to generate first timing signals for providing timings for supplying said test signal pattern to said IC device and a second timing signal for providing a timing for judging test result of said IC device;

(E) a plurality of pattern generating means, each assigned to each of said input/output pins, and for generating said test signal pattern in accordance with the timings defined by said first timing signals;

(F) a plurality of test result judging means, each assigned to each of said input/output pins, and each responsive to said test signal pattern and to responses of said IC device to said test signal pattern for judging the result of said responses at the timing of said second timing signal;

(G) a plurality of controllers, each for cooperating with said main controller, said timing signal adjusting means, said

pattern generating means and said test result judging means to measure errors of said first and second timing signals and an error of the length of a line between said IC test system and each of said input/output pins for performing arithmetic operations of and controls of said calibration of said errors;

(H) reference timing signal generating means receiving the clocks from said clock means and for generating a reference timing signal which defines a time reference when measuring said errors; and

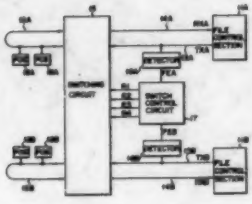
(I) distributing means for simultaneously distributing, in the case of said calibration of said errors, said reference timing signal to said plurality of test result judging means or to said plurality of test result judging means and all of said input/output pins; said main controller controlling said clock means, said common timing signal generating means, said plurality of controllers and said reference timing signal generating means to execute said calibration of said errors parallel among said plurality of controllers.

4,928,279

AUTOMATIC POS LOOP SWITCHING APPARATUS

Hidenori Maroi, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Mar. 16, 1987, Ser. No. 26,289
Claims priority, application Japan, Mar. 27, 1986, 61-69241
Int. Cl.[5] G06F *11/20*
U.S. Cl. 371—11.2 **15 Claims**



1. A POS loop switching apparatus comprising:

switching circuit means for selectively connecting first and second transmission lines, to which at least one Point of Sales (POS) terminal is connected, to first and second file control means which periodically supply a control signal, to constitute at least one closed loop; and

switch control means coupled to said switching circuit means, said switch control means including;

means responsive to control signals received from both of said first and second file control means for supplying a first switching signal to said switching circuit means for causing said switching circuit means to connect said first and second file control means respectively to said first and second transmission lines, to thereby constitute first and second closed loops;

means responsive to one of said first and second file control means not generating a control signal over a predetermined period of time, for supplying a second switching signal to said switching circuit means for causing said switching circuit means to connect one of first and second transmission lines which were connected to said one of said file control means which does not generate the control signal, to the other file control means, to thereby constitute a new closed loop which includes said transmission line, said other file control means, and the other transmission line connected to said other file control means; and

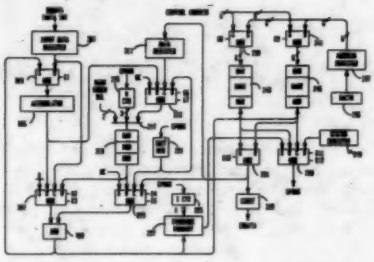
logic circuit means for supplying, when both output signals from said first and second malfunction detecting means are at said first predetermined level, the same logic signals as logic signals generated when both output signals are at said second predetermined level, to said switching circuit means.

4,928,280

FAST PROCESSOR FOR MULTI-BIT ERROR CORRECTION CODES

Marlin C. Nielson, Boulder, and Kenneth R. Woodruff, Louisville, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 29, 1988, Ser. No. 187,718
Int. Cl.[5] G06F *11/10*
U.S. Cl. 371—39.1 **9 Claims**



1. Apparatus for generating check symbols for error correctable encoding of blocks of messages composed of serial, multi-bit characters comprising:

means for receiving each successive character of a message;

means for processing successive input characters with partial check symbols generated from preceding received characters to form new partial check symbols;

means for accumulating partial check symbols until all message characters have been processed;

means for outputting accumulated check symbols to be concatenated with the block of said message characters while a next block of message characters is processed by the receiving, processing, and accumulating means;

means for selectively initializing said partial check symbols;

means for selecting the number of check symbols to be generated for each block of messages;

means for interleaving said message characters into sets; and

means for partitioning said check symbols whereby each said partition is associated with a different set of interleaved characters.

4,928,281

SEMICONDUCTOR MEMORY

Hiroko Kurosawa, Hino; Kazuya Itoh, Kodaira; Hisashi Nakamura, Ohme, and Masamichi Ishihara, Hinode, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 10, 1987, Ser. No. 60,331
Claims priority, application Japan, Jun. 13, 1986, 61-135915
Int. Cl.[5] G06F *11/10*
U.S. Cl. 371—51.1 **13 Claims**

1. A semiconductor memory comprising:

a memory array which outputs storage data, at least one data unit at a time, each data unit having a plurality of bits including a parity bit;

a first parity check circuit for performing parity check on storage data, at least one data unit at a time, output from said memory array;

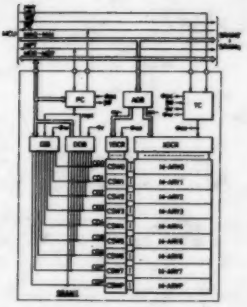
an external terminal means for outputting the result of said parity check; and

a second parity check circuit for performing parity check on input data, at least one data unit at a time, written into said memory array, each of said input data units having a plurality of bits including a parity bit, wherein said first

parity check circuit is also used as said second parity check circuit;

means for inhibiting an operation of writing said input data with respect to said memory array when a parity error is generated;

wherein said semiconductor memory is a static type RAM formed on one chip, and wherein said parity bit is added from a device which is provided outside said semiconductor memory; and



wherein said external terminal means for outputting the result of said parity check includes means for inputting-/outputting said parity bit, and the level of said external terminal means is changed to either a low or high level in accordance with the level of said parity bit when the result of said parity check is found to be normal, whereas, when a parity error is detected, the level of said external terminal is brought into a high-impedance state.

4,928,282

LASER GENERATOR WITH PHASE MODE-LOCKING

Alain Barthelemy; Serge Maneuf, and Claude Froehly, all of Limoges, France, assignors to Centre National De La Recherche Scientifique, France

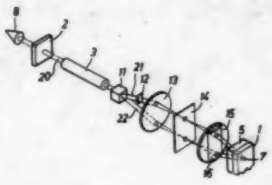
PCT No. OCT/FR88/00100, § 371 Date Oct. 20, 1988, § 102(e) Date Oct. 20, 1988, PCT Pub. No. WO88/06811, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 23, 1988, Ser. No. 276,448

Claims priority, application France, Feb. 24, 1987, 87 02411

Int. Cl.[5] H01S *3/098*

U.S. Cl. 372—18 **12 Claims**



1. A mode-locked laser generator comprising: a resonant cavity bounded by a rear reflecting mirror and an outlet semi-reflecting mirror with an active amplifying medium disposed therebetween, and a device for phase-locking the modes of the laser generator, said device being disposed between the amplifying active medium and the rear reflecting mirror said device having:

(i) a non-dispersive non-linear medium adjacent to said rear mirror, and

(ii) means for transforming a Gaussian beam of circular symmetry coming from the amplifier medium into a beam which travels by soliton propogation in said non-linear medium, said transforming means comprising a laser beam amplitude division interference device for forming two secondary waves, a space filter, and an afocal lens system disposed on the paths of the two secondary waves to form a reduced image of the interference pattern generated in the amplitude division interference device, said image being formed on an inlet of said to the non-linear medium opposite to the rear mirror, thereby providing a mode-locked laser in which solution propagation occurs inside said resonant cavity of said laser generator.

4,928,283

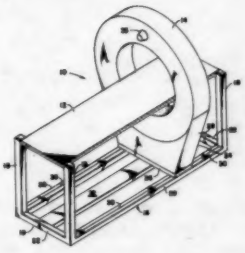
X-RAY TOMOGRAPHY APPARATUS

Bernard M. Gordon, Magnolia, Mass., assignor to Analogic Corporation, Peabody, Mass.

Filed Feb. 26, 1988, Ser. No. 160,657

Int. Cl.[5] H05G *1/02*

U.S. Cl. 378—20 **11 Claims**



1. An x-ray tomography apparatus, comprising:

an elongated patient table means having opposite ends;

a rotary fan beam x-ray tomography means encircling the patient table means; and

means for supporting the table means at opposite ends thereof and for supporting the tomography means from underneath and including means for moving the tomography means along a substantial portion of the table means,

wherein the tomography means includes means for causing at least a portion of the tomography means to continuously rotate around the table means.

4,928,284

LASER POWER CONTROL SYSTEM

Douglas H. Burns, Santa Clara, Calif., assignor to Lasa Industries, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 251,585, Sep. 28, 1988, abandoned. This application Jun. 20, 1989, Ser. No. 368,609

Int. Cl.[5] H01S *3/13*

U.S. Cl. 372—31 **14 Claims**

1. A method of precisely controlling the power of a laser beam comprising the steps of:

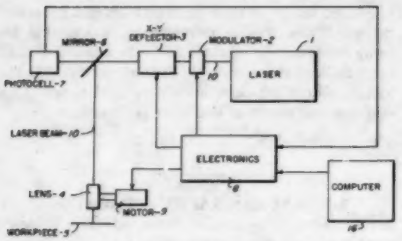
impinging a portion of a laser beam exiting an x-y deflector onto a photodetector, the photodetector generating an electrical feedback signal related to the power of said impinging laser beam exiting said x-y deflector;

combining said electrical feedback signal with a video information signal in a servo feedback loop including said x-y deflector and a single acousto-optical modulator to produce an acousto-optical modulator control error signal; and

supplying the modulator control error signal to said single acousto-optical modulator;

said control signal controlling said single acousto-optical

modulator to reduce the error signal produced in the servo feedback loop to substantially zero thereby adjusting the power level of the laser beam to a predetermined level.



4,928,285

IMPURITY-DOPED SEMICONDUCTOR LASER DEVICE FOR SINGLE WAVELENGTH OSCILLATION

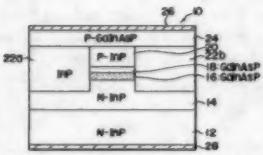
Mitsuhiro Kushibe, Tokyo; Kazuhiro Eguchi, Yokohama; Masahisa Funamizu, Tokyo, and Yasuo Ohba, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 23, 1989, Ser. No. 314,176

Claims priority, application Japan, Feb. 23, 1988, 63-40118; Feb. 23, 1988, 63-40119

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 **21 Claims**



1. In a semiconductor laser device comprising:

a semiconductive substrate; and

a stacked semiconductor layer section formed on said substrate and including clad layers, an active layer and a waveguide layer;

the improvement comprising: said active layer being doped with impurities of a rare earth element with a specific doping concentration so that a single wavelength oscillation spectrum is obtained by utilizing dispersion of wavelengths in the active layer based on changes in at least one of refractive index and reflectance, said specific doping concentration being high enough to confine only light components falling within a specific range of wavelength, of all the light components produced in said layer when said laser device is operative, within said layer so as to provide single wavelength laser oscillation and that is low enough to inhibit the degradation of emission efficiency of said active layer.

4,928,286

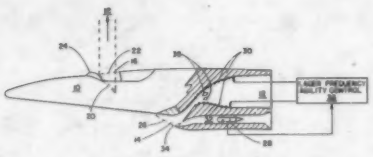
HYPERSONIC GASDYNAMIC LASER SYSTEM

Kenneth M. Foreman, North Bellmore, and Algirdas Maciulaitis, Islip, both of N.Y., assignors to Grumman Corporation, Bethpage, N.Y.

Filed Jul. 21, 1988, Ser. No. 222,143

Int. Cl.[5] H01S *3/09*

U.S. Cl. 372—90 **16 Claims**



1. A visible, or near to mid infra-red, hypersonic gasdynamic laser system, comprising:

a. a hypersonic vehicle for carrying the hypersonic gas dynamic laser system, and also providing high energy ram air for thermodynamic excitation and supply of the laser gas;

b. a laser cavity defined within said hypersonic vehicle and having a laser cavity inlet for the laser cavity formed by an opening in the hypersonic vehicle, such that ram air directed through said laser cavity opening supports gasdynamic lasing operations at wavelengths less than 10.6μ meters in the laser cavity; and

c. an optical train for collecting the laser radiation from said laser cavity and directing it as a substantially collimated laser beam to an output aperture defined by an opening in the hypersonic vehicle to allow the laser beam to be directed against a target.

4,928,287

AUTOMATIC EQUALIZER

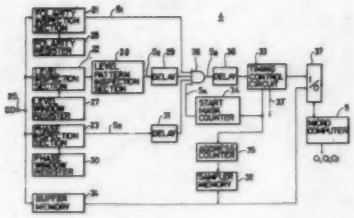
Masato Tanaka, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 2, 1989, Ser. No. 318,001

Claims priority, application Japan, Mar. 10, 1988, 63-57004

Int. Cl.[5] H04B *3/10*

U.S. Cl. 375—13 **12 Claims**



1. An adaptive digital equalizer system in which equalizer characteristics are automatically controlled, the system comprising:

a digital equalizer circuit having characteristics that are controllable by a plurality of equalization coefficients and producing an equalizer output signal;

inspection means responsive to a predetermined pattern of the equalizer output signal for producing an inspection output signal;

extraction means responsive to the inspection output signal for extracting a specific waveform therefrom; and

control means responsive to the extracted specific waveform for making an analysis of the extracted specific waveform

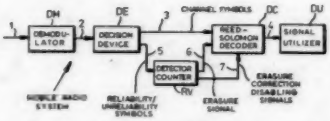
in accordance with predetermined parameters thereof and modifying said equalization coefficients in accordance with said analysis, said equalization coefficients as modified being supplied to said digital equalizer circuit for controlling the characteristics of said digital equalizer circuit.

4,928,288

DECODING METHOD AND DEVICE WITH ERASURE DETECTION FOR MULTILEVEL TRANSMISSION SYSTEMS

Giovanna D'Aria, Matera, and Giorgio Taricco, Turin, both of Italy, assignors to Societa' Italiana per L'Esercizio Delle Telecomunicazioni P.A., Turin, Italy

Filed Dec. 21, 1988, Ser. No. 288,401
Claims priority, application Italy, Dec. 22, 1987, 68104 A/87
Int. Cl.[5] H04L *1/20*
U.S. Cl. 375—17 **13 Claims**



1. A method of decoding multilevel signals and transmitting words each consisting of a plurality of code symbols which, in turn, comprise channel symbols, said method comprising the steps of:

(a) assigning respective decision thresholds to a levels of a multilevel signal corresponding to respective channel symbols;

(b) sampling an incoming multilevel signal to form a multiplicity of samples and comparing said samples with said decision thresholds to obtain a succession of said channel symbols from said incoming multilevel signal;

(c) supplying said succession of channel signals to an error correcting decoder outputting a utilizable decoded signal as a respective decoded word for each incoming multilevel signal;

(d) assigning to each of said decision thresholds a pair of supplementary thresholds defining a respective value region within which the respective decision threshold lies;

(e) generating an unreliability signal whenever said samples fall within a respective one of said value regions and indicating an unreliable channel symbol for the respective code symbol; and

(f) counting said unreliability signals for each of said code symbols and transmitting to said decoder a signal representing the existence of an erasure when the number of said unreliability signals for a respective code symbol exceeds a first predetermined number.

4,928,289

APPARATUS AND METHOD FOR BINARY DATA TRANSMISSION

Drake D. Dingeman, Springfield, Ohio, assignor to Systran Corporation, Dayton, Ohio

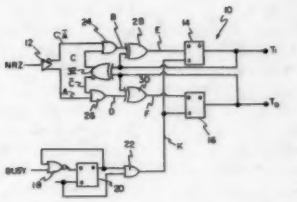
Filed Dec. 19, 1988, Ser. No. 286,186
Int. Cl.[5] H04L *25/49*
U.S. Cl. 375—20 **15 Claims**

1. Encoding apparatus for encoding a data signal comprising a stream of bits each of which is characterized by a first or a second binary state, said apparatus comprising:

means for accepting said data signal,

first encoding means responsive to the accepted data signal for generating a first binary code signal which undergoes a change of state for each consecutive bit in said data signal except those bits which have said second state and immediately follow a bit having said first state, and

second encoding means responsive to the accepted data



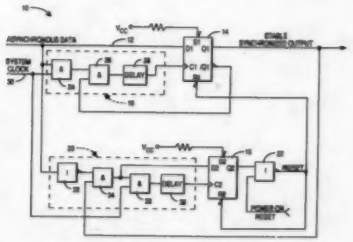
signal for generating a second binary code signal which undergoes a change of state for each consecutive bit in said data signal except those bits which have said first state and immediately follow a bit having said second state.

4,928,290

CIRCUIT FOR STABLE SYNCHRONIZATION OF ASYNCHRONOUS DATA

Tri T. Vo, San Diego, Calif., assignor to NCR Corporation, Dayton, Ohio

Filed Nov. 7, 1988, Ser. No. 268,147
Int. Cl.[5] H04L *7/02*
U.S. Cl. 375—118 **36 Claims**



30. A synchronizer circuit comprising:

a first latch having inputs for receiving an asynchronous data signal, a first delayed system clock signal and a reset signal, and an output for providing a system clock synchronized version of said asynchronous input signal; and

first delaying means for receiving as inputs a system clock signal and said asynchronous data signal and an output for providing said first delayed system clock signal.

4,928,291

CONTROL CLUSTER PROVIDED WITH REMOVABLE CONTROL ELEMENTS FOR A NUCLEAR FUEL REACTOR

Bruno Mouesca, Lotissement "Le Coteau", Saint-Maurice de Gourdans 01800 Meximieux, and Bruno Ladouceur, 1 Bis C, rue Vignet Trouvé , 69270 Fontains S/Saone, both of France

Filed Jun. 10, 1987, Ser. No. 60,291
Claims priority, application France, Jun. 10, 1986, 86 08381
Int. Cl.[5] G21C *7/10*
U.S. Cl. 376—327 **8 Claims**

1. Control cluster for controlling a nuclear reactor comprising

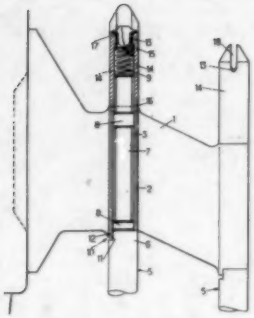
(a) a spider having a plurality of arms angularly distributed about a vertical axis and directed substantially radially each of said arms comprising at least one vertical sleeve

formed with a vertical bore of predetermined length opening into a lower end surface and an upper end surface of the sleeve;

(b) a plurality of vertical control elements each for connection to a respective one of the vertical sleeves of said spider; and

(c) a plurality of internally threaded fastening pieces, each for securing a respective one of said control elements to one of said sleeves;

(d) wherein each of said control elements has an upper plug formed with a longitudinally upwardly extending shank projecting into a respective one of the vertical bores, formed with shoulder means for abutment against the lower ends surface of the respective vertical sleeve, comprising spaced radially enlarged portions having a sliding fit in and located entirely within the respective vertical bore, having an overall length from said shoulder means larger than the said predetermined length, whereby the shank has a distal portion which projects upwardly out of



the respective vertical bore when said shoulder means are in abutment with said lower end surface, said distal portion of the shank which projects upwardly out of the respective vertical bore having a threaded portion entirely located above and at a distance from the upper end surface of the respective vertical bore and a part of reduced diameter between said threaded part and an uppermost of said enlarged portions,

(e) wherein each of said internally threaded fastening pieces is tightly screwed on the threaded part of a respective one of the control elements and is in abutting contact with the upper surface of the respective sleeve, wherein the fastening piece exerts a clamping force on the shank for locking and supporting the respective control element on the associated sleeve, and

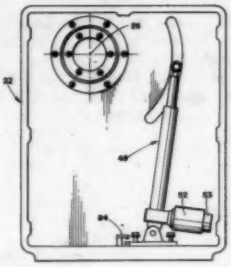
(f) wherein each upper end surface is at a distance from the threaded portion sufficient to allow room for cutting of said fastening piece and of the part of reduced diameter of the respective shank, between said upper end surface and said thread portion of the shank.

4,928,292

GANTRY TILT AND SUPPORT ASSEMBLY FOR CT SCANNER

Anton Z. Zupancic, Kirtland, and Joseph S. Deucher, Lyndhurst, both of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Filed Nov. 25, 1988, Ser. No. 276,243
Int. Cl.[5] H05G *1/60*
U.S. Cl. 378—17 **10 Claims**



1. Computerized tomographic scanner apparatus comprising:

a base frame means including a pair of laterally and vertically extending support members;

a gantry assembly including a source of penetrating radiation and a detector for detecting radiation coming from said source; said gantry assembly carried by said support members by bearing means arranged to permit said gantry assembly to be tilted about a first generally horizontal axis extending between said vertically extending support members;

drive means for selectively tilting said gantry assembly about said first axis, said drive means including first and second longitudinally extensible and retractable power units each including a separate respective motor associated therewith and having a first end connected to said base frame and a second end connected to said gantry assembly at a point spaced radially outward of said first axis;

control means for controlling the operation of said power units including means for producing synchronous movement of said power units; and,

said control means further including means responsive to failure of operation of either of said power units for stopping the motor associated with the other power unit.

4,928,293

APPARATUS FOR STABILIZATION OF X-RAY FLUORESCENCE LAYER THICKNESS MEASURING INSTRUMENTS FOR STABILIZATION SNF PROCESS THEREOF

Hans H. Behncke, Gartenstr. 36, D-7400 Tubingen, Fed. Rep. of Germany

Filed Sep. 23, 1987, Ser. No. 100,164
Int. Cl.[5] G01N *23/223*
U.S. Cl. 378—50 **19 Claims**

1. Apparatus for stabilization of a proportional counting tube for a layer thickness measuring instrument according to the X-ray fluorescence principle, said instrument having an X-ray generator and a counting tube,

said apparatus comprising:

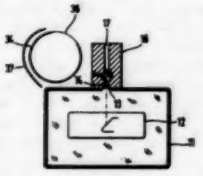
a first closing device for X-rays laying downstream in terms of radiation and alongside said counting tube,

an operating device for bringing said first closing device at least into a closed position and an open position,

and the improvement wherein:

means define a bypass passage leading from said counting tube to at least said X-rays, which is arranged to be open in said closed position of said first closing device,

a second closing device is arranged in said bypass passage, said second closing device being arranged to allow X-rays to enter said bypass passage only when said first closing device is closed completely, and



means are provided for establishing a damping transmittance characteristic through said bypass passage such that the counting rate of radiation arriving at said counting tube through said bypass passage is in the range of counting rates reflected by an object to be measured.

4,928,294

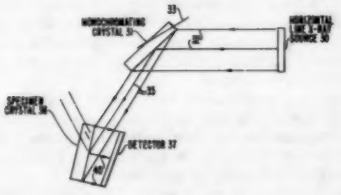
METHOD AND APPARATUS FOR LINE-MODIFIED ASYMMETRIC CRYSTAL TOPOGRAPHY

Warren T. Beard, Jr., Upper Marlboro, and Ronald W. Armstrong, Edgewater, both of Md., assignors to U.S. Government as represented by the Director, National Security Agency, Fort George G. Meade, Md.

Filed Mar. 24, 1989, Ser. No. 330,348

Int. Cl.[5] G01N *23/20*

U.S. Cl. 378—74 **13 Claims**



13. A method for high resolution x-ray imaging of a crystal comprising:

projecting an x-ray beam from a horizontal line source onto a monochromating crystal;

diffracting said beam at an angle relative to the surface of the crystal such that the quantity of energy diffracted at the surface of the crystal is maximized while the horizontal and vertical divergence of the diffracted beam are minimized;

projecting the diffracted beam onto a specimen crystal; and

diffracting the diffracted beam at an angle relative to the surface of the specimen crystal such that the angle of the diffracted beam relative to the normal of the specimen crystal is minimized.

4,928,295

HIGH-VOLTAGE GENERATING DEVICE FOR USE WITH AN X-RAY TUBE

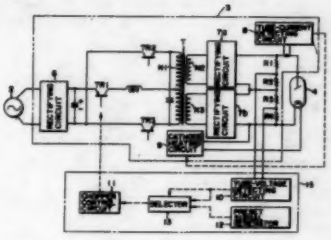
Shigeru Tanaka, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 21, 1988, Ser. No. 247,455

Claims priority, application Japan, Sep. 30, 1987, 62-243924

Int. Cl.[5] H05G *1/34*

U.S. Cl. 378—104 **6 Claims**



1. A high-voltage generating device for use with an X-ray tube, comprising:

first rectifying means, having first and second output terminals, for rectifying an A.C. voltage from an A.C. power supply;

a converter for converting an output of said first rectifying means to an A.C. voltage and boosting the converted A.C. voltage, the converter including a boosting transformer having a primary winding having a neutral point and first and second ends, the neutral point of said primary winding being connected to said first output terminal of said first rectifying means through a chopper transistor, and each of said first and second ends of said primary winding being connected to said second output terminal of said first rectifying means through a first inverter transistor and a second inverter transistor, said first and second inverter transistors being alternately operated, said converter further including a second winding for providing an A.C. high voltage, each of said chopper transistor and said first and second inverter transistors having a predetermined voltage rating;

second rectifying means for converting an output of said converter to a D.C. voltage for application to said X-ray tube;

detecting means for detecting an output voltage of said second rectifying means to produce a signal corresponding to the detected voltage;

preset signal generating means for generating a signal having a constant voltage lower than the voltage ratings of said chopper transistor and said first and second inverter transistors; and

feedback control means for controlling a switching operation of said converter on the basis of an output of said preset signal generating means at the start of operation and on the basis of an output of said detecting means thereafter.

4,928,296

APPARATUS FOR COOLING AN X-RAY DEVICE

Vedanth Kadambi, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 4, 1988, Ser. No. 177,234

Int. Cl.[5] H01J *35/10*

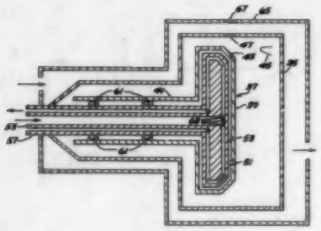
U.S. Cl. 378—141 **5 Claims**

1. An X-ray generating tube comprising:

a hollow rotatable anode including a hollow disc-shaped portion having a ring-shaped target track, said disc-shaped portion affixed to a first tube extending coaxially from the

disc-shaped portion, the interior of the hollow disc-shaped portion and the interior of the first tube being in flow communication with one another;

a stationary insert having a stationary disc-shaped portion situated inside the hollow disc-shaped portion of said anode and spaced away therefrom, said stationary insert further having a second and third tube, each being affixed to said stationary disc portion and extending coaxially therefrom, said second tube being spaced away from and surrounded by said first tube, said third tube being spaced away from and surrounded by said second tube, said stationary disc portion defining a passageway in flow



communication with the interior of the third tube at one end, extending below the surface of the stationary disc portion and in flow communication at the other end with the annular space formed between the second and third tubes;

bearing means for rotatably mounting said first tube on said second tube;

cathode means directed at said ring shaped target for generating an electron beam; and

vacuum enclosure means enclosing said hollow rotatable anode and said cathode means, said interior of said hollow rotatable anode in flow communication with the interior of said vacuum enclosure means.

4,928,297

RADIOGRAPHIC DIAGNOSTIC APPARATUS

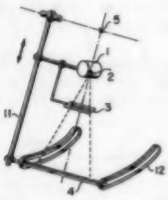
Hiroshi Tsutsui, Yawata; Sueki Baba, Suita; Koichi Ohmori, Toyonaka; Osamu Yamamoto, Moriguchi, and Hiroshi Watanabe, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 22, 1988, Ser. No. 184,829

Claims priority, application Japan, Apr. 22, 1987, 62-98956

Int. Cl.[5] G21K *5/10*

U.S. Cl. 378—146 **4 Claims**



1. A radiographic diagnostic apparatus comprising:

an X-ray tube for generating X-ray radiation, said X-ray tube having a focal spot,

a line slit for shaping said X-ray radiation into a fan beam, said line slit extending in a direction of alignment,

a linear X-ray sensor array for detecting said X-ray radiation, and

movable means for rotating said X-ray tube, said line slit, and said linear X-ray sensor array about a specified fixed point so as to maintain alignment of said X-ray tube, said line slit, and said linear X-ray sensor array relative to said specified fixed point such that said focal spot of said X-ray tube and said line slit are disposed on a straight line which passes through said specified fixed point and a predetermined portion of said linear sensor array, such that said X-ray tube, said line slit and said linear X-ray sensor array move together in a direction perpendicular to the direction of alignment of said linear X-ray sensor array to scan an object, said focal spot of said X-ray tube being spaced from said specified fixed point, and such that a radiographic image of the object can be produced from an output of said linear X-ray sensor array; and

said X-ray tube and said line slit are movable along said straight line connecting said fixed point and said predetermined portion of said linear X-ray sensor array.

4,928,298

INFORMATION-BEARING SHEET FOR X-RAY FILM

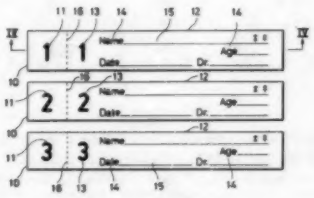
Hiroyuki Tanaka, Kanagawa, Japan, assignor to NIX Company, Ltd., Tokyo, Japan

Filed Jul. 30, 1985, Ser. No. 760,554

Claims priority, application Japan, Aug. 7, 1984, 59-120630

Int. Cl.[5] H05G *1/28*

U.S. Cl. 378—162 **13 Claims**



1. An information-bearing sheet suitable for use with an X-ray film in order to avoid confusion between X-ray pictures of different objects, comprising:

a mark-bearing portion which is opaque to X-rays to be applied to the X-ray film and exposed to X-rays upon taking an X-ray picture of an object on the X-ray film; and

a data-filling portion bearing, in a form-printed thereon, the same mark as the mark-bearing portion, containing at least one blank space for filling out identification data of the object therein and provided in combination with the mark-bearing portion;

wherein the mark-bearing portion and data-filling portion have adhesive layers on the back sides thereof and the information-bearing sheet further comprises a releasable base sheet on which the mark-bearing portion and data filling are releasably affixed; and

the mark-bearing portion and data-filling portion are formed of a single piece of paper with a tear line, thereby permitting separation of the single piece of paper along the tear line into the mark-bearing portion and data-filling portion upon application of the information-bearing sheet.

4,928,299

COIN OPERATED TELEPHONE OPERATION MONITORING SWITCH MOUNTING ARRANGEMENT

John L. Tansky, Sewell, N.J.; Edward F. Logan, Jr., Downingtown, and Patrick J. McGarry, West Chester, both of Pa., assignors to Mars Incorporated, McLean, Va.

Filed May 26, 1989, Ser. No. 357,762

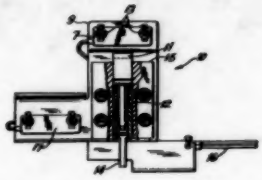
Int. Cl.[5] H04M *17/00*

U.S. Cl. 379—37 **17 Claims**

1. A payphone event monitoring system which may be

readily installed in a standard payphone housing using preexisting payphone cutouts and which generates signals indicative of the removal of a coin box, a vault door or a front cover, comprising:

(a) a first sensor bracket assembly to which is attached a front cover sensor and a vault door sensor;



(b) a second sensor bracket assembly, containing a coin box sensor; and

(c) a means for monitoring the sensors and sending a signal indicative of removal of the coin box, vault door or front cover.

4,928,300

VIDEOPHONE WITH DETACHABLE TV CAMERA

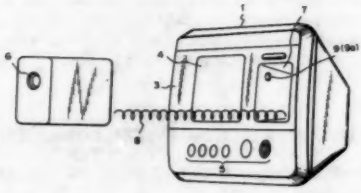
Kokji Ogawa, and Mikio Onoki, both of Gunma, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

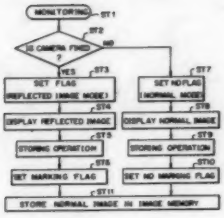
Filed Apr. 18, 1989, Ser. No. 339,805

Claims priority, application Japan, Jun. 27, 1988, 63-158688; Jul. 29, 1988, 63-189908

Int. Cl.[5] H04M 11/00; H04N 7/14

U.S. Cl. 379—53 **9 Claims**





1. A videophone comprising:

a TV camera detachably accommodated in the unit of said videophone, said TV camera being connected to the videophone unit through a cable;

means for displaying image data picked-up by said TV camera or image data transmitted through a telephone line; and

means for detecting whether or not said TV camera is fixed in the videophone unit;

the image displayed on said displaying means being automatically switched between a reflected image and a true image in response to the output from said detecting means.

4,928,301

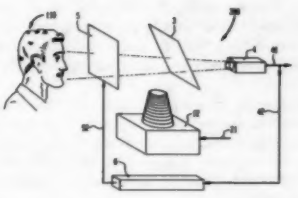
TELECONFERENCING TERMINAL WITH CAMERA BEHIND DISPLAY SCREEN

Lanny S. Smoot, Morris Township, Morris County, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Continuation-in-part of Ser. No. 292,030, Dec. 30, 1988, abandoned. This application Oct. 31, 1989, Ser. No. 429,387

Int. Cl.[5] H04M 11/00; H04N 7/14

U.S. Cl. 379—53 **11 Claims**



2. A teleconferencing terminal which enables communicants to have eye contact during a teleconference, said terminal comprising

a screen which can be switched between a transparent state and an image display state,

a video camera including image capture circuitry positioned behind said screen,

means for receiving a composite video signal comprising successive video fields, and

a control unit in communication with said screen for applying control signals to said screen so that said screen is alternately in said transparent state during which said image capture circuitry of said video camera is activated and in said image display state during which one of said video fields is displayed, wherein said successive video fields are separated by vertical retrace intervals, and wherein said screen is in said transparent state during said vertical retrace intervals.

5. A method for operating a teleconferencing terminal comprising a screen, a video camera located directly behind the screen, and means for receiving a video signal, said method comprising the steps of

applying control signals to said screen to alternate said terminal between an image capture mode wherein said screen is switched to a first, transparent state and said video camera is activated to capture an image through said screen and an image display mode wherein said screen is switched to a second state for display of an image field of a video signal received by said receiving means, wherein in said second state said screen is translucent.

4,928,302

VOICE ACTUATED DIALING APPARATUS

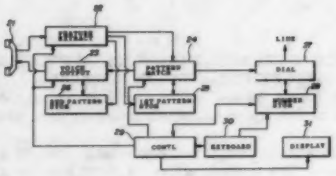
Kunihiro Kaneuchi, Yokohama; Seigou Yasuda, Yokosuka; Takashi Ariyoshi, Yokohama; Tomofumi Nakatani, Yokohama, and Hiroshi Aizawa, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Nov. 1, 1988, Ser. No. 265,766

Claims priority, application Japan, Nov. 6, 1987, 62-281833; Nov. 6, 1987, 62-281832; Nov. 6, 1987, 62-281831; Nov. 6, 1987, 62-281830; Dec. 9, 1987, 62-311397; Dec. 15, 1987, 62-316942; Jan. 22, 1988, 63-7355[U]; Jan. 22, 1988, 63-7356[U]; Jul. 13, 1988, 63-174099; Sep. 8, 1988, 63-224951; Sep. 8, 1988, 63-224950; Sep. 19, 1988, 63-233995

Int. Cl.[5] H04M *1/27*

U.S. Cl. 379—88 **11 Claims**



1. A voice actuated dialing apparatus comprising:

input/output means for inputting and outputting data;

feature extraction means for extracting a feature of input data received through said input/output means;

storage means for storing standard patterns and corresponding telephone numbers of destination subscribers as registered data;

pattern matching means for comparing a standard pattern of the feature extracted by said feature extraction means with the standard patterns stored in said storage means so as to recognize a predetermined one of the stored standard patterns which matches the standard pattern of the extracted feature;

speech synthesis means for outputting through said input/output means a speech corresponding to said predetermined stored standard pattern read-out from said storage means so as to confirm a result of the recognition made in said pattern matching means;

dialing means for dialing of a predetermined one of the telephone numbers stored in said storage means and corresponding to said predetermined standard pattern in a voice-dialing mode; and

control means for controlling operation sequences of said feature extraction means, said storage means, said pattern matching means, said speech synthesis means and said dialing means;

said control means successively outputting to said input/output means at least a part of the registered data stored in said storage means in response to a search instruction received from said input/output means designating the part to be successively outputted;

said pattern matching means having a preliminary selection part and a main selection part, said preliminary selection part in response to the search instruction comparing a certain portion of the standard pattern of the feature extracted by said feature extraction means with corresponding portions of the standard patterns stored in said storage means when the search instruction accompanies a subject of search so as to select specific standard patterns having a certain similarity to said certain portion, said main selection part comparing the standard pattern of the feature extracted by said feature extraction means with only said specific standard patterns so as to recognize the predetermined one of the specific standard patterns which mates the standard pattern of the extracted feature.

4,928,303

CABLING SYSTEM FOR LOW VOLTAGE AND VERY LOW VOLTAGE NETWORKS IN A BUILDING

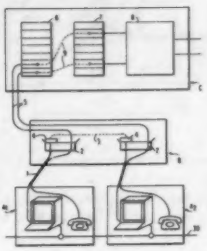
Jean-Claude Allin, 102, rue Claude Benard, 95610 Eragny, and Jacques Nozick, 28, rue Broca, 75005 Paris, both of France

Filed Dec. 29, 1988, Ser. No. 291,897

Claims priority, application France, Dec. 29, 1987, 87 18267

Int. Cl.[5] H04M *11/00*; H01R *11/00*

U.S. Cl. 379—93 **10 Claims**



1. A telephone and computer precabling element comprising:

a cable including at least one pair of wires for establishing a telephone link and at least one pair of wires for establishing a computer link;

at least one socket for connection to telephone equipment and at least one socket for connection to computer equipment, said sockets being connected to one end of the corresponding pairs of wires in the cable; and

a connection module including at least as many pairs of contacts as the cable has pairs of wires, with said pairs of computer wires and said pairs of telephone wires being connected to contacts in the same module.

4,928,304

ELECTRONIC SWITCHING SYSTEM CONNECTED TO AN EXTERNAL COMPUTER

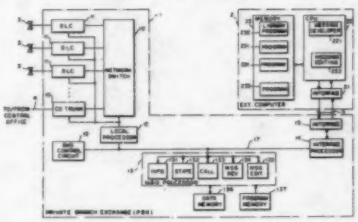
Hiroshi Sakai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 6, 1988, Ser. No. 240,640

Claims priority, application Japan, Sep. 4, 1987, 62-222429

Int. Cl.[5] H04M *3/42, 11/08*

U.S. Cl. 379—94 **2 Claims**



1. An electronic switching system comprising:

a plurality of telephone terminals having display means and key input means;

an electronic exchange apparatus having a network switch for accommodating said telephone terminals, control means for achieving exchange service functions between said telephone terminals; and

an external computer connected to said control means through a computer interface including an application

program for providing non-telecommunication service functions unrelated to said exchange service functions;

said control means including first facility means for initiating said application program in response to a key input operation at any of said telephone terminals and for setting a data transmission path to said external computer, second facility means for transmitting operated key data from any of said telephone terminals to said application program via said path when service by said application program is in use. third facility means for controlling said display means of any communicating one of said telephone terminals in response to an instruction from said application program when said service by said application program is in use; and

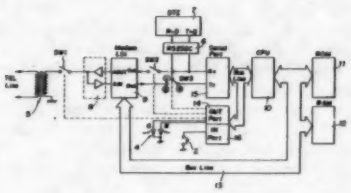
whereby said application program initiated by said first facility means controls said telephone terminals as input-/output terminals for said nontelecommunication service functions using said second and third facility means.

4,928,305

INTELLIGENT MODEM WITH MANUAL ESCAPE SWITCH

Eiichi Yui, Yokohama, Japan, assignor to Omron Tateisi Electronics Company, Kyoto, Japan

Filed Nov. 21, 1988, Ser. No. 273,829
Claims priority, application Japan, Nov. 25, 1987, 62-297101
Int. Cl.[5] H04M *11/00*
U.S. Cl. 379—98 **4 Claims**



1. An intelligent modem system comprising:

a modem circuit;

an interface circuit for connection to an information processing terminal;

a switching means for interconnecting said modem circuit with a public communication line and with said interface circuit;

a controller for controlling operation of said modem means and said switching circuit such that said system selectively operates in a transparent mode in which said switching means places said modem circuit in a data communication relationship with an information processing terminal connected to said interface circuit while said modem circuit is also placed in communication relationship with said public communication line, or in an escape mode in which said switching means takes said modem circuit out of a data communication relationship with said information processing terminal to permit altering the status of said modem circuit by said controller while said modem circuit remains connected with said public communication line; and,

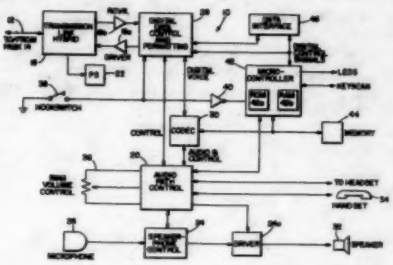
an operator operable switch means coupled to said controller for causing said controller to operate said switching means to change from one of said transparent and escape modes to the other of said transparent and escape modes.

4,928,306

DYNAMICALLY CONFIGURABLE TELEPHONE

Gautam Biswas; David C. Black; Michael G. Duncan, all of Austin; Gary R. Key, Round Rock; Gordon D. Leak, Austin, and Robert D. Whittington, Pflugerville, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 28, 1989, Ser. No. 317,256
Int. Cl.[5] H04M *3/42*
U.S. Cl. 379—201 **31 Claims**



1. Telephone apparatus comprising:

means for communicating telephone related information in a bidirectional manner with a telephone exchange; and

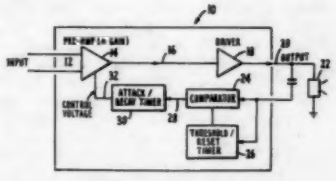
means, coupled to the communicating means, for receiving telephone related information therefrom, the telephone related information therefrom, the telephone related information including information for specifying at least one operational configuration of the telephone, the at least one operational configuration including information for specifying at least one telephone signal power parameter, the receiving means comprising means for configuring the telephone apparatus in accordance with the received information.

4,928,307

TIME DEPENDENT, VARIABLE AMPLITUDE THRESHOLD OUTPUT CIRCUIT FOR FREQUENCY VARIANT AND FREQUENCY INVARIANT SIGNAL DISCRIMINATION

Dwight D. Lyan, Santa Cruz, Calif., assignor to ACS Communications, Scotts Valley, Calif.

Filed Mar. 2, 1989, Ser. No. 318,073
Int. Cl.[5] H04M *1/60*
U.S. Cl. 379—395 **6 Claims**



1. A signal compression system comprising:

(a) amplifier means for amplifying an input signal to provide a power-boosted output signal, the gain of the amplifier means corresponding to a variable control voltage applied to the amplifier means;

(b) means for comparing the power-boosted output signal and an initial threshold signal to provide a comparator output corresponding to the difference between the power-boosted output signal and the initial threshold signal;

(c) means responsive to the comparator output for providing a variable control voltage corresponding to the comparator output; and

(d) means responsive to the power-boosted output signal for switching the initial threshold signal to a second threshold signal if the power-boosted output signal exceeds the initial threshold signal for a pre-selected period of time.

4,928,308

ECHO CANCELLER CIRCUIT

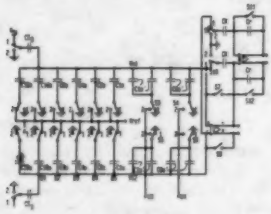
Bernward Roessler, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 906,363, Sep. 12, 1986, abandoned. This application Dec. 16, 1988, Ser. No. 287,569

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1985, 3533902

Int. Cl.[5] H04B 3/23

U.S. Cl. 379—411 **3 Claims**



1. A circuit for cancellation of echoes including a network of capacitors which takes part in digital to analog conversion of digital compensation signals supplied by an adpative transversal filter, in a compensation process comprising the subtraction of such compensation signals converted to analog signals from the echo-laden wanted signals supplied to said circuit, and in the analog to digital conversion of the resultant signal resulting from the compensation process which may be laden with a residual echo signal, said resultant signal to be supplied to the transversal filter as a digital correction signal, an upper set of capacitor plates of the network being connected together, and said network including capacitors corresponding with more significant bits of said digital compensation signals which are binary-weighted in their capacitance and switched by their other plates forming separate terminals of the network selectively either to ground potential or to a reference potential, and capacitors corresponding to less significant bits than said more significant bits of said digital compensation signals which are switchable by their lower plates selectively to ground potential or to fractions of the reference voltage potential, said fractions corresponding to the bit combinations of the less significant bits, characterized in that the capacitor network comprises two symmetrical halves, said halves being equal with respect to their construction and with respect to capacitance and correspondence with bits of said digital compensation signals (C0o', C1o' . . . C32o, CSo; C0u', C1u' . . . C32u', CSu), and said halves respectively comprising an additional capacitor (C32o, C32u), which additional capacitor is also switchable to ground potential or to a reference potential by one plate thereof while its other plate in connected together with the upper set of plates of said network of capacitors, as well as a scanning capacitor (CSo, CSu) of the same capacitance as that of the additional capacitor, the echo-laden wanted signals being supplied by way of said additional capacitor and by way of said scanning capacitor to the network, in the case of said additional capacitor said signals being supplied in the form as supplied to said circuit and in the case of said scanning capacitor in phase opposition thereto, and in which each of said other plates of said capacitors in said similarly arranged and valued network halves and corresponding to the more significant bits in one network half are applied to a different one of (a) ground potential and (b) reference potential than the corresponding capacitor of the other network half, and that a respective end of each network half associated with said plates connected together is connected to respective inputs of a comparator (V) comprising an operational amplifier having outputs respectively connectable to a respective one of said comparator inputs by means of a semiconductor switch.

4,928,309

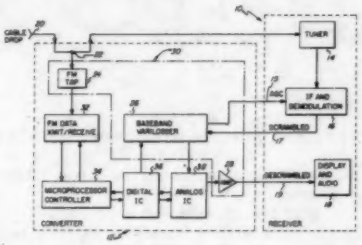
METHOD AND APPARATUS FOR DESCRAMBLING A TELEVISION SIGNAL

Charles M. White, Perkasie, Pa., assignor to General Instrument Corporation, New York, N.Y.

Filed Mar. 31, 1989, Ser. No. 332,555

Int. Cl.[5] H04N 7/167

U.S. Cl. 380—15 **20 Claims**



1. A baseband converter for descrambling sync suppressed video television signals comprising:

a signal level processor having an input and an output;

means for coupling the input of said signal level processor to receive a baseband television signal having a video portion with suppressed sync pulses;

control means coupled to said signal level processor for causing the processor to shift the level of predetermined portions of said signal to restore said sync pulses to a normal unsuppressed level with respect to the rest of the baseband television signal;

means for deriving a reference voltage equal to the zero carrier level of the video portion of said baseband television signal;

means for applying the reference voltage to said signal level processor for use in maintaining the level of the restored sync pulse at a proper value; and

means for coupling the level shifted signal from the output of said processor to a video appliance.

4,928,310

PSEUDORANDOM PULSE CODE GENERATORS USING ELECTRO-OPTICAL XOR GATES

Anastosios P. Goutzoulis, Pittsburgh, and David K. Davies, Churchill Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 17, 1989, Ser. No. 380,959

Int. Cl.[5] H04L 9/02

U.S. Cl. 380—46 **23 Claims**

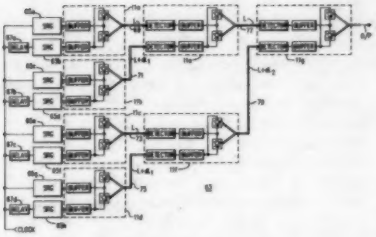
1. A code generator generating pseudorandom digital codes comprising:

a source of optical pulses;

a plurality of optical XOR gates each having at least two optical inputs and one optical output; and

optical fiber means interconnecting the optical outputs of selected of said XOR gates to selected inputs of other of said XOR gates in a pattern which generates a single

optical output representing said pseudorandom digital code, said optic fiber means having lengths selected to



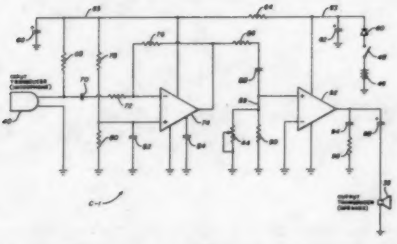
effect selected delays in the transmission of light pulses between selected ones of said optical XOR gates.

4,928,311

NOISE LIMITING CIRCUIT FOR EARMUFFS

Lyle D. Trompler, 13906 Wickersham, Houston, Tex. 77077

Continuation of Ser. No. 815,883, Jan. 3, 1986, abandoned. This application Jul. 1, 1987, Ser. No. 70,104
Int. Cl.[5] A61F *11/02*
U.S. Cl. 381—72 8 Claims



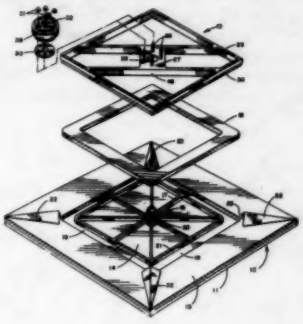
1. A noise limiting circuit for earmuffs, comprising:
a voltage source;
a microphone for receiving sound waves and producing a microphone output signal in response thereto;
amplifier means adapted to receive and amplify said microphone output signal and connected to said voltage source;
said amplifier means including an input terminal, an amplifier circuit, and an output terminal;
said amplifier means further including gain control means for providing said amplifier means with substantially constant circuit gain as the magnitude of the microphone output signal varies from zero to a level which saturates said amplifier circuit;
said gain control means comprising means for providing substantially constant feedback resistance between said amplifier means output and input terminals, wherein said feedback resistance is selected so as to provide saturation of said amplifier circuit when the input signal level from said microphone exceeds normal conversational levels;
said microphone output signal being coupled to said amplifier means input terminal by a direct path;
speaker means for producing sound waves in response to an electrical signal; and
volume control means connected between said amplifier means output terminal and said speaker means for dividing said amplifier means output signal so that when said amplifier circuit is saturated said signal provided to said speaker means is at a level which causes said speaker means to produce a safe level of sound waves.

4,928,312

ACOUSTIC TRANSDUCER

Amel Hill, 2837 Summer Brooke Way, Carrelbury, Fla. 32707

Filed Oct. 17, 1988, Ser. No. 262,946
Int. Cl.[5] H04R *7/06*; G10K *13/00*
U.S. Cl. 381—192 15 Claims



1. An acoustic transducer comprising:
a one piece sheet of foamed polymer material having different densities in different portions thereof, said different portions comprising a periphery portion of a first density, a diaphragm portion of a second density formed in the center of said one piece sheet of foamed polymer material, and a resilient diaphragm suspension portion separating said periphery portion and said diaphragm portion and said resilient diaphragm suspension portion having a third density lower than said periphery portion density; wherein said diaphragm portion has a plurality of reinforcing ribs formed thereon and has a foamed polymer surround ridge immediately adjacent said diaphragm suspension portion and intersecting said reinforcing ribs; a groove immediately adjacent said ridge and formed by said periphery portion, said resilient diaphragm suspension portion and said ridge;
a resilient insert attached in said groove in said one piece sheet of foamed polymer material;
a voice coil former fixedly attached to said diaphragm portion;
at least one frame support portion formed on said periphery portion; and
a frame attached to said frame support portion and extending over a portion of said diaphragm portion, said frame having a magnet attached thereto in a position to be aligned with said voice coil former whereby a panel speaker is formed.

4,928,313

METHOD AND SYSTEM FOR AUTOMATICALLY VISUALLY INSPECTING AN ARTICLE

Patrick F. Leonard; Donald J. Svetkoff; Robert W. Kelley; Donald K. Rohrer, all of Ann Arbor, and E. North Coleman, Jr., Dearborn Heights, all of Mich., assignors to Synthetic Vision Systems, Inc., Ann Arbor, Mich.

Continuation of Ser. No. 140,667, Jan. 4, 1988, abandoned, which is a continuation of Ser. No. 791,470, Oct. 25, 1985, abandoned. This application May 19, 1989, Ser. No. 355,816
Int. Cl.[5] G06K *9/00*
U.S. Cl. 382—8 14 Claims

1. A method for automatically and visually inspecting an article, the method comprising the steps of:
acquiring a first set of digital image data representing a known good article, the image data representing a two dimensional reference image, processing the first set of

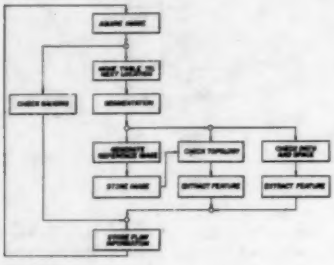
image data to separate the reference image into at least two identifiable areas having a boundary therebetween;

compressing the reference image in each of the two dimensions of the reference image, the step of compressing including the steps of reducing at least one of the areas of the reference image to an edge represented by a number of data points and reducing the number of data points representing the edge;

storing the compressed reference image;

acquiring a second set of digital image data representing a two-dimensional image of an article under inspection;

processing the second set of digital image data to separate



the image of the article under inspection into at least two identifiable areas having a boundary therebetween;

retrieving the compressed reference image;

regenerating the retrieved reference image, said step of regenerating including the step of regenerating the edge from the reduced number of data points, regenerating the at least one of the areas from the regenerated edge, and constructing border regions around at least one of the areas of the reference image to obtain a regenerated reference image; and

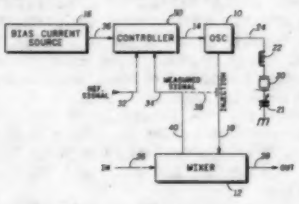
matching the regenerated reference image and the image of the article under inspection to identify areas where mismatches occur.

4,928,314

HETERODYNE STAGE HAVING PRECISE CLOSED-LOOP CONTROL OF THE AMPLITUDE OF THE INJECTION SIGNAL THEREOF

Walter J. Grandfield, Lake worth; James G. Mittel, Boynton Beach, and Walter L. Davis, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 27, 1989, Ser. No. 302,701
Int. Cl.[5] H04B *1/26*
U.S. Cl. 455—236 **10 Claims**



1. A heterodyne stage of a receiver comprising:

source of bias current;

local oscillator circuit responsive to bias current supplied from said source for generating an injection signal at a predetermined frequency and an amplitude based on the amount of bias current supplied;

mixer circuit governed by said injection signal to convert a receiver signal from one frequency to another frequency by a heterodyning process;

means for measuring the amplitude of said injection signal; and

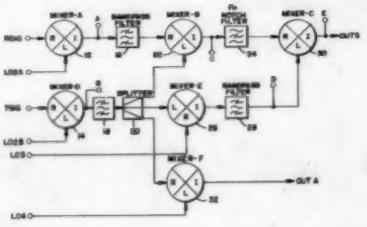
differential amplifier circuit having one transistor stage input coupled to said measuring means to effect a signal representative of the amplitude of said injection signal and another transistor stage input biased at a reference level, and including a circuit stage governed by said amplitude representative signal and said reference level to adjust the amount of bias current supplied to said oscillator circuit by said source within a non-zero bias current range.

4,928,315

CHIRPED BACKSCATTER FILTER

Preben B. Jensen, Rancho Palos Verdes, and Edward L. Arms, Torrance, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 21, 1987, Ser. No. 136,063
Int. Cl.[5] H04B *1/10, 1/12*
U.S. Cl. 455—307 **19 Claims**



1. A frequency filter for removing an undesired frequency component from a received signal having a desired frequency component, comprising:

means for adding a first offset frequency to a received signal for generating a received signal intermediate frequency, said received signal having at least one desired frequency component and an undesired frequency component of known frequency;

means for adding a second offset frequency to a reference signal for generating a reference signal intermediate frequency, said reference signal having a frequency component substantially equal to said undesired frequency component, said first offset frequency differing from said second offset frequency by a predetermined frequency such that a frequency component of said received signal intermediate signal that is associated with said undesired frequency component differs from said frequency component of said reference signal intermediate signal by an amount substantially equal to said predetermined frequency;

means for subtracting said received signal intermediate frequency from said reference signal intermediate frequency to generate a first difference frequency signal having a frequency component substantially equal to said predetermined frequency,; and

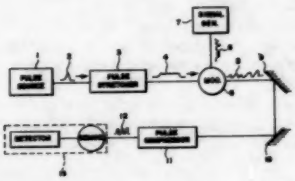
means for removing from said first difference frequency signal said frequency component having said predetermined frequency to generate a filtered received signal wherein the undesired frequency component is substantially eliminated.

4,928,316

OPTICAL SYSTEMS AND METHODS BASED UPON TEMPORAL STRETCHING, MODULATION AND RECOMPRESSION OF ULTRASHORT PULSES

Jonathan P. Heritage, Red Bank Borough, and Andrew M. Weiner, Eatontown Borough, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Feb. 4, 1988, Ser. No. 152,237
Int. Cl.[5] H04B 9/00
U.S. Cl. 455—600 **23 Claims**



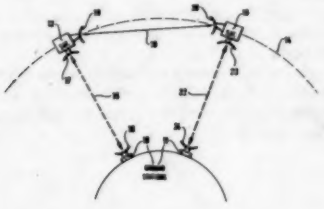
1. A communication system comprising an ultra-short optical pulse source, pulse stretching means responsive to an ultra-short optical pulse from said source for producing a chirped temporally stretched pulse, modulator means for serially modulating the chirped temporally stretched optical pulse in accordance with predetermined information, and pulse compression means for temporally recompressing the modulated stretched pulse so as to result in a shaped ultra-short optical pulse containing retrievable information in accordance with said modulation.

4,928,317

RADIO-OPTICAL TRANSMISSION SYSTEM, IN PARTICULAR FOR SPACE TELECOMMUNICATIONS

Elisabeth Franchini, Ramonville Saint Agne, France, assignor to Societe Anonyme dite: Alcatel Espace, Courbevoie, France

Filed Oct. 14, 1988, Ser. No. 257,620
Claims priority, application France, Oct. 29, 1987, 87 14994
Int. Cl.[5] H04B 9/00
U.S. Cl. 455—601 **4 Claims**



1. A radio-optical transmission system for transmitting information, in particular for space telecommunications, said system comprising:

a first, radio-optical interface device for converting a first modulated radio wave to a light wave, said first radio-optical interface device being a microwaveoptical interface device comprising:

a microwave receiver circuit; and

an optical transmitter circuit connected to an output of said microwave receiver circuit and comprising, in succession:

a mixer receiving an oscillator signal;

a filter connected to an output of said mixer and providing a filtered output accordingly;

an amplifier receiving said filtered output to provide an amplified filtered output;

a current controlling circuit receiving said amplified filtered output and providing a current controlled output accordingly;

a laser having its injection current modulated in accordance with said current controlled output; and

a temperature control circuit connected to said laser, such that said optical transmitter circuit transmits said information without intermediate demodulation thereof;

said radio-optical transmission system further comprising a second, optical-radio interface device for converting said light wave to a second modulated radio wave, said second, optical-radio interface device being an optical-microwave interface device comprising:

an optical receiver circuit comprising, in succession:

an optical matching circuit followed by a detector diode;

a filter connected to an output of said detector diode and providing a filtered output accordingly;

at least one amplifier receiving said filtered output;

a frequency acquisition and tracking loop coupled to an output of said amplifier;

a laser;

a current controlling circuit, coupled to an output of said frequency acquisition and tracking loop, for controlling the laser;

a temperature control circuit for controlling the laser;

said laser being connected to an input of the optical matching circuit, wherein said optical receiver receives said information without intermediate demodulation thereof; and

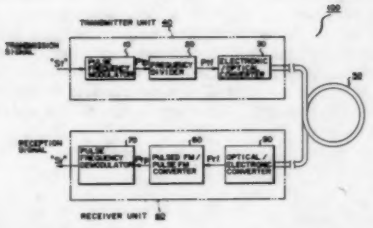
a microwave transmitter circuit connected to an output of said optical receiver circuit.

4,928,318

OPTICAL SIGNAL TRANSMISSION SYSTEM INCLUDING PULSED FM MODULATOR/DEMODULATOR

Hiroyuki Ibe, 1-3-1-807, Namiki, Kanazawa-ku, Yokohama-shi; Taro Shibagaki, 1-29-5, Minamimagome, Oota-ku, Tokyo, and Fumihiko Shimizu, 1F-3, Hikari-So, 2-30-2, Konan-ku, Yokohama-shi, all of Japan

Continuation-in-part of Ser. No. 831,864, Feb. 24, 1986, abandoned. This application Dec. 22, 1987, Ser. No. 136,534
Claims priority, application Japan, Feb. 28, 1985, 60-39298
Int. Cl.[5] H04B 9/00
U.S. Cl. 455—608 **9 Claims**



1. An optical signal transmission system comprising:

means for frequency-modulating an input signal to produce a pulse frequency-modulated (FM) transmission signal;

means for frequency-dividing the pulse frequency-modulated transmission signal to produce a pulsed frequency-modulated (PFM) transmission signal;

first converting means, connected to said frequency-dividing means and including a laser means for emitting a laser light, for converting the pulsed frequency-modulated transmission (PFM) signal into a corresponding laser light signal;

second converting means for converting the laser light signal output from said first converting means, into a pulsed frequency-modulated (PFM) reception signal;

transmission means, connected between said first and second converting means and including a multi-mode fiber means, for transmitting the laser light signal from said first converting means to said second converting means;

third converting means, connected to said second converting means and including delay detection means, for converting the pulsed frequency-modulated (PFM) reception signal into a pulse frequency-modulated (FM) reception signal, thereby decreasing a modal noise; and

means for demodulating the pulse frequency-modulated (FM) reception signal to produce a reception signal corresponding to the input signal; including

a mono-multivibrator for receiving said pulse frequency-modulated reception signal from said third converting means to output a pulse FM signal with a constant pulse width; a limiting pulse amplifier connected to said mono-multivibrator for amplifying the pulse FM signal with amplitude thereof being limited; and a low pass filter series connected to said limiting pulse amplifier for filtering baseband components contained in said pulse FM signal so as to derive said reception signal.

4,928,319

METHOD AND ARRANGEMENT FOR TRANSMITTING POWER IN OPTICAL FORM OVER OPTICAL FIBRES

Gilles D. Pitt, Saffron Walden; Roger E. Jones, Cambridge; George R. Antell, Saffron Walden, all of England; Lyndon R. Spicer, Newport, United Kingdom; John A. Barnett, Orpington, United Kingdom, and Robert Hill, Newcastle Upon Tyne, United Kingdom, assignors to Standard Telephones Cables Public Limited Company, London, United Kingdom

Continuation of Ser. No. 258,054, Oct. 17, 1988, abandoned, which is a continuation of Ser. No. 788,586, Oct. 17, 1985, abandoned. This application Mar. 24, 1989, Ser. No. 328,761

Claims priority, application United Kingdom, Oct. 17, 1984, 8426291

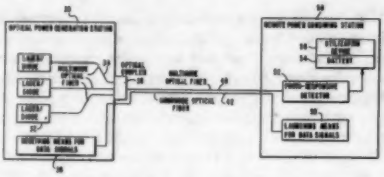
Int. Cl.[5] H04B 9/00

U.S. Cl. 455—612 **10 Claims**

1. A power transmission arrangement in which operating power for a remote device is conveyed as light, the arrangement comprising a power generation station for generating optical power, a remote power consuming station separated from said power generation station, and optical fibre means coupling the power generation station to the power consuming station for conveying said optical power thereto, said optical fibre means comprising a long wavelength multimode first optical fibre having a relatively thick core size in the range 50 to 400 μm, the power generation station including a plurality of high-power gas or solid-state laser or superluminescent diodes, each having an optical output with a wavelength of the order of 0.70 to 1.7 μm and each feeding light energy into a respective second length of multimode optical fibre, and means for inputting the optical power output of the power generation station into one end of the said optical fibre means, said inputting means comprising an optical coupler coupled to the respective second lengths of multimode optical fibre from said plurality of lasers or diodes and to one end of the first optical fibre, wherein the remote power consuming station includes a photo-responsive detector upon which the optical power conveyed thereto and output from another end of the optical fibre means falls, and a utilization device coupled to the detector for utilizing said power, and wherein the detector includes a layered structure of the following layers;

(i) a first relatively thick layer of the order of 200 μm of indium phosphide doped to have n^- semi-insulating characteristic for receiving optical energy being directed to this layer,

(ii) a front contact which has a thickness in the range of 2 to μm of LPE indium phosphide of n^+ type and a doping of the order of 10^{18}-10^{19-3} disposed on the first layer,



(iii) a metalization on said front contact layer on an opposite face from the first layer for providing one contact for the extraction of electrical energy, which metallization covers a relatively small part of the opposite face,

(iv) a buffer layer also on the said opposite face of the front contact layer, which buffer layer has a thickness of the order of 1 μm, and is of LPE indium phosphide, n^- type doping of the order of 10^{16} cm^{-3},

(v) a layer of LPE indium gallium arsenide, n^- type doping of the order of 10^{16} cm^{-3}, which layer has a thickness of the order of 3 μm,

(vi) another layer of LPE indium gallium arsenide having a thickness of the order to 5 μm and being p^+ type doping of the order of 10^{18} cm^{-3}, and

(vii) a titanium gold alloy metallization on the outer face of the layer of p^+ type indium gallium arsenide, which metallization provides another contact for the extraction of electrical energy.

DESIGN PATENTS

GRANTED MAY 22, 1990

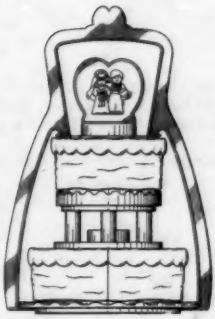
ERRATA

For CLASS	See PATENT NO.
D25-001	308,097

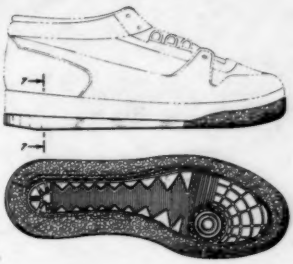
DESIGNS

MAY 22, 1990

307,970
WEDDING CAKE
William J. Maloney, II, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Jul. 8, 1987, Ser. No. 70,889
Term of patent 14 years
U.S. Cl. D1—129

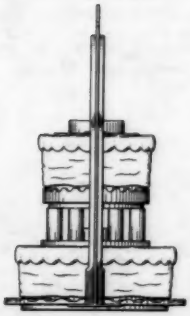


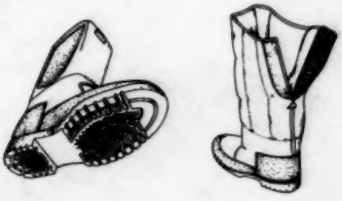
307,971
SHOE SOLE
Angelo Maccano, Simi Valley, and Dreanna Nakao, Los Angeles, both of Calif., assignors to L.A. Gear, Inc., Los Angeles, Calif.
Filed May 2, 1988, Ser. No. 189,229
Term of patent 14 years
U.S. Cl. D2—320



307,972
SANDAL
Laddie Sebestik, 164 Philippe, Rosemère, Québec, Canada (J7A 2X6)
Filed Dec. 21, 1987, Ser. No. 135,309
Term of patent 14 years
U.S. Cl. D2—270

307,973
RIDING-BOOT
Ann-Charlotte Wannius, Skanör, Sweden, assignor to Larstrade Intl. AB, Vastra Frolunda, Sweden
Filed Aug. 6, 1987, Ser. No. 82,422
Claims priority, application Sweden, Feb. 18, 1987, 87-0357
Term of patent 14 years
U.S. Cl. D2—274



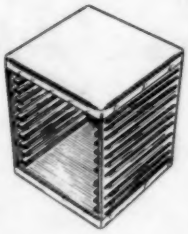


307,974
SHOE UPPER
Kimberly A. McKinstry, Redondo Beach, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Filed Apr. 11, 1989, Ser. No. 336,313
Term of patent 14 years
U.S. Cl. D2—314

307,975
SHOE OUTSOLE
Christopher Kittle, Cohasset; James R. Holt, Medfield, and James H. Schumacher, Canton, all of Mass., assignors to Reebok International Ltd., Stoughton, Mass.
Filed Feb. 9, 1989, Ser. No. 308,153
Term of patent 14 years
U.S. Cl. D2—320

307,976
THREAD ORGANIZER
Ellen D. McCarn, 3049 Cambridge Rd., Birmingham, Ala. 35223
Filed Nov. 17, 1986, Ser. No. 931,360
Term of patent 14 years
U.S. Cl. D3—21

307,977
DISC STORAGE CONTAINER
Robert A. Egly, 31 Belcourt S., Newport Beach, Calif. 92660, and Patrick Sullivan, 1752 Brookshire Ave., Tustin, Calif. 92680
Filed Jan. 16, 1987, Ser. No. 4,534
Term of patent 14 years
U.S. Cl. D3—35

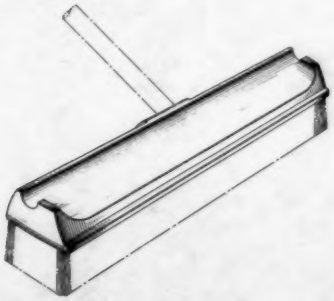


307,978
AUTOMOBILE STORAGE BAG
Donald A. Dallape, 770 Paularino Ave., Costa Mesa, Calif. 92626
Filed Jan. 5, 1987, Ser. No. 986
Term of patent 14 years
U.S. Cl. D3—40

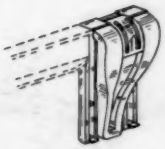
307,979
COMBINED KEY RING AND CHANGE PURSE
Janet L. Purvis, P.O. Box 2983, Canoga Park, Calif. 91306
Filed Jul. 17, 1987, Ser. No. 74,516
Term of patent 14 years
U.S. Cl. D3—62

307,980
SURFER PEN KEY RING
Kyrk Walters, 305 Robin Hill Dr., Altamonte Springs, Fla. 32701
Filed Oct. 13, 1987, Ser. No. 107,534
Term of patent 14 years
U.S. Cl. D3—62

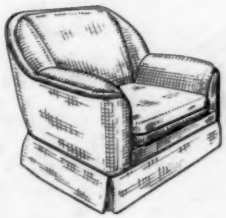
307,981
COMBINED PUSH BROOM HEAD AND SCRAPER
Jolyon Saunders, Green Bay, New Zealand, assignor to Libman Broom Company, Arcola, Ill.
Filed Mar. 30, 1987, Ser. No. 31,446
Term of patent 14 years
U.S. Cl. D4—118



307,982
HANGER CLAMP
Everett L. Duester, Zeeland, Mich., assignor to Batts, Inc., Zeeland, Mich.
Continuation-in-part of Ser. No. 941,283, Dec. 12, 1986, abandoned. This application Nov. 16, 1987, Ser. No. 121,592
Term of patent 14 years
U.S. Cl. D6—328

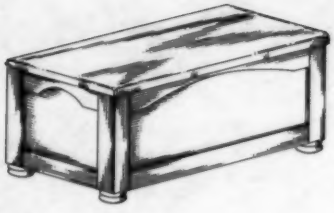


307,983
SEAT
Hoi Choi, Whitby, Canada, assignor to Sklar-Peppler Inc., Whitby, Canada
Filed Feb. 17, 1987, Ser. No. 15,603
Term of patent 14 years
U.S. Cl. D6—334

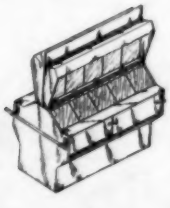


307,984
SEAT
Randy Culler, High Point, N.C., assignor to Sklar-Peppler Inc., Whitby, Canada
Filed Mar. 2, 1987, Ser. No. 20,651
Term of patent 14 years
U.S. Cl. D6—334

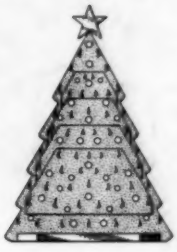
307,985
STORAGE CHEST OR SIMILAR ARTICLE
Phyllis J. Hoff, P.O. Box 1445, Sutter Creek, Calif. 95685
Filed Mar. 9, 1987, Ser. No. 23,523
Term of patent 14 years
U.S. Cl. D6—440



307,986
DISPLAY CABINET
Martin L. Falk, P.O. Box 210, Wildwood, N.J. 08260
Filed Jul. 22, 1987, Ser. No. 76,196
Term of patent 14 years
U.S. Cl. D6—440

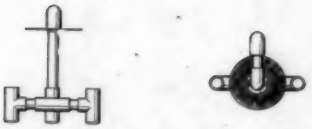


307,987
BEVERAGE DISPLAY STAND
Rafael T. Bustos, Alpharetta, Ga., assignor to Leggett & Platt, Incorporated, Carthage, Mo.
Filed Nov. 24, 1986, Ser. No. 934,319
Term of patent 14 years
U.S. Cl. D6—450

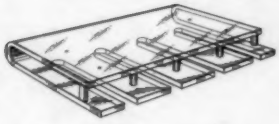


307,988
DISPLAY STAND
Gail F. Newfield, Mandeville, La., assignor to Sazerac Co., Inc., New Orleans, La.
Filed Nov. 9, 1987, Ser. No. 118,515
Term of patent 14 years
U.S. Cl. D6—450

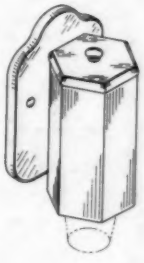
307,989
EARRING DISPLAY STAND
Janet L. Stewart, 1825 Tecalote Dr., Fallbrook, Calif. 92028
Division of Ser. No. 869,923, Jun. 2, 1986. This application Mar. 29, 1989, Ser. No. 333,598
Term of patent 14 years
U.S. Cl. D6—467



307,990
STEMWARE RACK
Robert R. Funk, 232 No. Rios Ave., Solana Beach, Calif. 92075
Filed Nov. 9, 1987, Ser. No. 118,421
Term of patent 14 years
U.S. Cl. D6—513



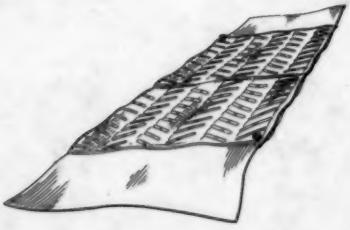
307,991
CUP DISPENSER
Larry M. Lofquist, 3803 Patriot La., Circle Pines, Minn. 55014
Filed Apr. 15, 1988, Ser. No. 182,327
Term of patent 14 years
U.S. Cl. D6—516



307,992
END CAP FOR A TOILET TISSUE HOLDER
Stanley T. Gresens, Chicago, and A. Denton Green, Evanston, both of Ill., assignors to Amerock Corporation, Rockford, Ill.
Division of Ser. No. 898,644, Aug. 21, 1986, Pat. No. Des. 300,998. This application Mar. 23, 1989, Ser. No. 327,568
Term of patent 14 years
U.S. Cl. D6—523

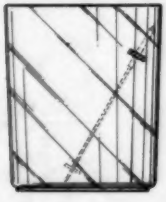
307,993
BILL CENTER
Glenn Cignarella, 53 Mason Ave., Newton, N.J. 07860
Continuation-in-part of Ser. No. 910,166, Sep. 19, 1986, abandoned. This application May 18, 1987, Ser. No. 53,518
Term of patent 14 years
U.S. Cl. D6—553

307,994
INFLATABLE MATTRESS
Joan Stuckey, 166 Burns Road, Turramurra, N.S.W. 2074, Australia
Filed Aug. 1, 1986, Ser. No. 892,396
Claims priority, application Australia, Feb. 4, 1986, 4061/86
Term of patent 14 years
U.S. Cl. D6—604

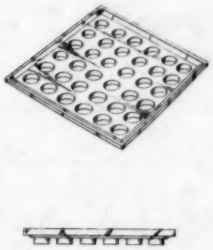


307,995
CHAIR COVER
Mitchell T. Kelldorf, 17820 Alexander Run, Jupiter, Fla. 33458
Filed Apr. 26, 1988, Ser. No. 186,213
Term of patent 14 years
U.S. Cl. D6—610

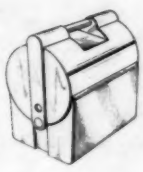
307,996
TUMBLER WITH A SWIZZLE STICK HOLDER
Robert A. DeMars, 7932 Maestro Ave., Canoga Park, Calif. 91304
Filed May 12, 1986, Ser. No. 862,595
Term of patent 14 years
U.S. Cl. D7—507



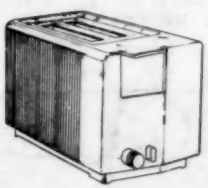
307,997
ICE DISTRIBUTION TRAY
David T. Bernstein, 303 Lake Ferry La., Atlanta, Ga. 30339
Filed Mar. 1, 1988, Ser. No. 162,464
Term of patent 14 years
U.S. Cl. D7—616



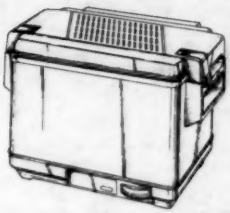
307,998
PORTABLE INSULATED CHEST
James J. J. Costello, Houston, Tex., and William A. Prindle, Santa Barbara, Calif., assignors to Igloo Products Corporation, Houston, Tex.
Filed Feb. 29, 1988, Ser. No. 162,152
Term of patent 14 years
U.S. Cl. D7—605



307,999
TOASTER
Hartwig Kahlcke, Kronberg, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany
Filed Aug. 19, 1987, Ser. No. 87,271
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, 73 MR 9565
Term of patent 14 years
U.S. Cl. D7—330



308,000
DEEP FRYER
Hans E. Slany, and Reinhard Renner, both of Esslingen, Fed. Rep. of Germany, assignors to I.T.T. Industries Belgium S.A., Brussels, Belgium
Filed Jul. 29, 1986, Ser. No. 891,973
Claims priority, application World Int. Prop. O., Jan. 30, 1986, DM/006411
Term of patent 14 years
U.S. Cl. D7—360



308,001
FOOD MIXER
Andre Ricard, Barcelona, Spain, assignor to Moulinex (Societe Anonyme), Bagnolet, France
Filed Feb. 11, 1988, Ser. No. 154,596
Claims priority, application France, Aug. 11, 1987, 87 4760
Term of patent 14 years
U.S. Cl. D7—376

308,002
PAN OR THE LIKE FOR POURING LIQUIDS INTO A DRUM
Edward Dohrmann, 540 Kipp St., Teaneck, N.J. 07666
Filed Apr. 8, 1988, Ser. No. 179,905
Term of patent 14 years
U.S. Cl. D7—700

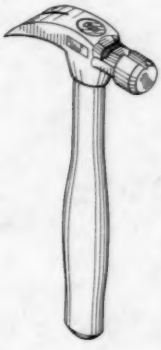
308,003
ELECTRIC TRIMMER MOTOR HOUSING WITH AN EXTENDABLE HANDLE
Roy Krzynyk, 229 E. Irvin Ave., State College, Pa. 16801
Filed May 18, 1988, Ser. No. 195,542
Term of patent 14 years
U.S. Cl. D8—8

308,004
COMBINED WEEDING AND FURROWING HOE HEAD
Paul S. Dawley, and Sally Dawley, both of 6010 Morgan Pl., Loomis, Calif. 95650
Filed Nov. 4, 1988, Ser. No. 267,516
Term of patent 14 years
U.S. Cl. D8—11

308,005
COMBINED TRACTOR TRAILER PIN PULLER AND FLASHLIGHT
Ernest G. Nickert, 8227 W. Lafayette, Detroit, Mich. 48209
Filed Aug. 6, 1987, Ser. No. 82,366
Term of patent 14 years
U.S. Cl. D8—14

308,006
HANDLE FOR MANUAL RELEASE OF A PAPER ROLL SPINDLE
Daniel T. Robbins, 368 E. Lombardy La., Banning, Calif. 92220
Filed Apr. 11, 1988, Ser. No. 180,268
Term of patent 14 years
U.S. Cl. D8—14

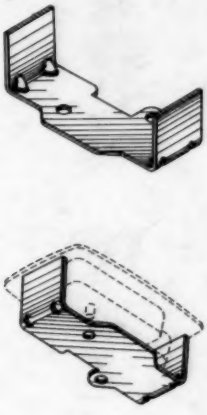
308,007
NAIL HOLDING HAMMER
Dennis A. Ferguson, and Tracey B. Lettiere, both of 1205 Orchard, Ridgecrest, Calif. 93555
Filed Mar. 3, 1988, Ser. No. 163,414
Term of patent 14 years
U.S. Cl. D8—75



308,008
HOSE CLAMP
Sheldon Bissell, 6551 Mountain Ranch Rd., Mountain Ranch, Calif. 95246
Filed Mar. 16, 1988, Ser. No. 168,747
Term of patent 14 years
U.S. Cl. D8—72

308,009
FOLDING KNIFE
Torbjörn Evrell, Eskilstuna, Sweden, assignor to Eskilstuna Knivfabriks AB, Eskilstuna, Sweden
Filed Dec. 11, 1987, Ser. No. 131,536
Claims priority, application Sweden, Nov. 23, 1987, 87-2734
Term of patent 14 years
U.S. Cl. D8—99

308,010
MOUNTING BRACKET FOR LATCHES AND LOCKS
Richard H. Russell, Farmington, and Thomas V. McLinden, Oxford, both of Conn., assignors to The Eastern Company, Cleveland, Ohio
Division of Ser. No. 72,278, Jul. 10, 1987. This application Jun. 28, 1989, Ser. No. 372,945
Term of patent 14 years
U.S. Cl. D8—343

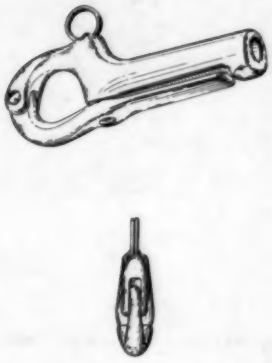


308,011
ANCHOR FOR ROPE OR THE LIKE
Jerry D. Norris, Rte. 1, P.O. Box 391, Hooks, Tex. 75561
Filed Jan. 5, 1987, Ser. No. 954
Term of patent 14 years
U.S. Cl. D8—356

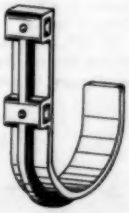
308,012
POLY-V PULLEY WITH BEARING HUB
Masahiro Kanemitsu, Kobe, Japan, assignor to Kabushiki Kaisha Kanemitsu, Japan
Filed Jul. 1, 1986, Ser. No. 880,913
The portion of the term of this patent subsequent to Mar. 15, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—360

308,013
POLY-V PULLEY WITH AXIALLY DISPLACED HUB
Masahiro Kanemitsu, Kobe, Japan, assignor to Kabushiki Kaisha Kanemitsu, Japan
Filed Jul. 1, 1986, Ser. No. 880,914
The portion of the term of this patent subsequent to Sep. 20, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—360

308,014
SAFETY CLIP
Gerard Issard, Thiers, France, assignor to Wichard, Thiers, France
Filed May 4, 1987, Ser. No. 45,579
Claims priority, application Hague, Dec. 31, 1986, DM/00 8018
Term of patent 14 years
U.S. Cl. D8—367



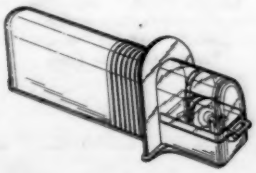
308,015
MARINE UTILITY HOOK
Joseph W. Volpe, 3024 Barton Dr., Sterling Heights, Mich. 48310, and William T. Chynoweth, 3770 Darleen Ct., Troy, Mich. 48084
Filed Aug. 31, 1987, Ser. No. 91,013
Term of patent 14 years
U.S. Cl. D8—367



308,016
SEAL
Gary E. Tritton, and Victor R. Tritton, both of Pointe Claire, Canada, assignors to Les Entreprises Tritton Ltee, Chomedey, Canada
Filed Jan. 15, 1987, Ser. No. 3,695
Claims priority, application Canada, Jul. 17, 1986, 17-07-86-3
Term of patent 14 years
U.S. Cl. D8—394

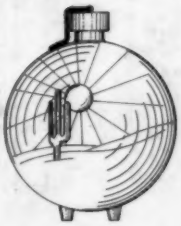
308,017
CLAMP FOR CLAMPING WIRES
Akio Fujioka, Ichikawa, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan
Filed Dec. 30, 1987, Ser. No. 139,711
Claims priority, application Japan, Oct. 13, 1987, 62-41770
Term of patent 14 years
U.S. Cl. D8—396

308,018
KNIFE SHARPENER
Erkki O. Lindén, Billnäs, and Timo Sunila, Karjaa, both of Finland, assignors to Fiskars OY AB, Helsinki, Finland
Filed Feb. 12, 1988, Ser. No. 155,641
Claims priority, application Finland, Aug. 14, 1987, 634/87
Term of patent 14 years
U.S. Cl. D8—93



308,019
COMBINED PACKAGE AND DISPENSER FOR EXTRUSIBLE COMESTIBLES
George Milcos, Riverdale, N.Y., assignor to Kraft General Foods, Inc., Glenview, Ill.
Filed Sep. 2, 1986, Ser. No. 903,054
Term of patent 14 years
U.S. Cl. D9—306

308,020
CANTEEN-SHAPED BEVERAGE CONTAINER OR SIMILAR ARTICLE
Edgar R. Laverde, P.O. Box 7024, New York, N.Y. 10116
Filed Mar. 3, 1989, Ser. No. 318,376
Term of patent 14 years
U.S. Cl. D9—307

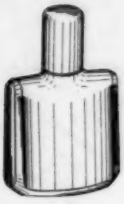


308,021
PACKAGING CONTAINER
Eiji Natori, Konosu, Japan, assignor to Chuo Kagaku Kabushiki Kaisha, Saitama, Japan
Filed Dec. 16, 1986, Ser. No. 942,578
Claims priority, application Japan, Oct. 7, 1986, 61-39778
Term of patent 14 years
U.S. Cl. D9—310

308,022
BOTTLE
Steven J. Mintz, Edgewater; Ward J. Haidle, Bordentown, and John S. Fraser, Long Beach Township, Ocean County, all of N.J., assignors to Kraft General Foods, Inc., Glenview, Ill.
Filed Oct. 20, 1988, Ser. No. 260,327
Term of patent 14 years
U.S. Cl. D9—375

308,023
PERFUME BOTTLE
Ateliers Diasnd, Levallois-Perret, France, assignor to Worth Parfums, Paris, France
Filed Sep. 30, 1987, Ser. No. 103,256
Claims priority, application France, Apr. 14, 1987, 87 2189
Term of patent 14 years
U.S. Cl. D9—377

308,024
BOTTLE AND CAP
Edward J. Kunesh, Kenosha County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Aug. 12, 1988, Ser. No. 231,544
Term of patent 14 years
U.S. Cl. D9—403



308,025
GREASE CARTRIDGE PACKAGE
Billy J. Gregory, Kansas City, Mo., assignor to Witco Corporation, New York, N.Y.
Filed May 13, 1988, Ser. No. 193,646
Term of patent 14 years
U.S. Cl. D9—415

308,026
LAPEL COMMUNICATOR
Donald G. Victory, W15880 Peaceful Ave., Sheldon, Wis. 54766
Filed Sep. 30, 1987, Ser. No. 102,899
Term of patent 14 years
U.S. Cl. D11—46

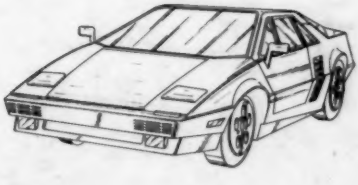
308,027
EARRING
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Dec. 14, 1987, Ser. No. 132,106
Claims priority, application Italy, Jun. 22, 1987, 35871/87[U]
Term of patent 14 years
U.S. Cl. D11—43

308,028
CHRISTMAS TREE STAND
Wilson P. Moriarty, P.O. Box 377, Atchison, Kans. 66002
Filed Jul. 11, 1988, Ser. No. 216,995
Term of patent 14 years
U.S. Cl. D11—130.1

308,029
FLORAL FOAM HOLDER FOR A VASE
Juan Kladt, Mooresville, N.C., assignor to Vase D-Lite, Mooresville, N.C.
Filed Sep. 14, 1987, Ser. No. 95,939
Term of patent 14 years
U.S. Cl. D11—164

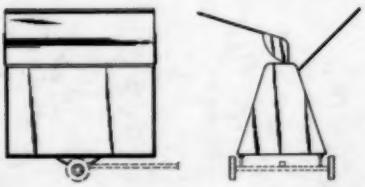
308,030
TIE CLASP
Hassan Restum, 7629 Theisen, Dearborn, Mich. 48126
Filed Apr. 3, 1987, Ser. No. 33,596
Term of patent 14 years
U.S. Cl. D11—204

308,031
AUTOMOBILE
Avelino Falero, P.O. Box 618, Juncos, P.R. 00666
Filed May 27, 1987, Ser. No. 54,679
Term of patent 14 years
U.S. Cl. D12—91

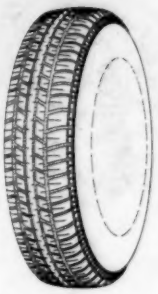


308,032
TRUCK CAB
Jeffery E. Kersey, Hayward; Charles E. Koske, Fremont, and Daniel E. Oen, San Francisco, all of Calif., assignors to Paccar Inc., Bellevue, Wash.
Filed Aug. 31, 1987, Ser. No. 91,258
The portion of the term of this patent subsequent to May 8, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—96

308,033
EXTERIOR SHELL OF A CAMPER KITCHEN TRAILER BODY
Wallace Cornell, Rte. 1, Box 1566, Hemphill, Tex. 75948
Filed Dec. 17, 1987, Ser. No. 134,055
Term of patent 14 years
U.S. Cl. D12—102

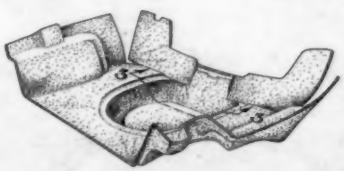


308,034
TIRE TREAD AND BUTTRESS
Maurice Graas, Luxembourg, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Feb. 27, 1985, Ser. No. 706,361
Claims priority, application Benelux, Aug. 28, 1984, 30449-01/02
Term of patent 14 years
U.S. Cl. D12—147

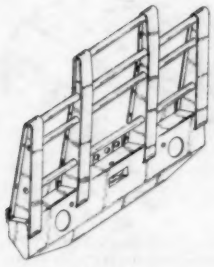


308,035
TRACTION DEVICE FOR PREVENTION OF SLIDING OF A VEHICLE TIRE
Makoto Goto, 11-12, Takasago 1-chome, Katsushika-ku, Tokyo, Japan
Filed Nov. 23, 1987, Ser. No. 123,991
Term of patent 14 years
U.S. Cl. D12—154

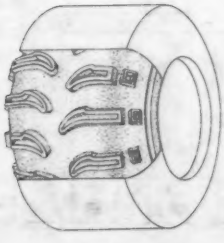
308,036
AUTOMOBILE TRUNK LINER
Robert A. Queen, Marion, N.C., and Michael D. Faloon, Canton Township, Wayne County, Mich., assignors to Collins & Aikman, Charlotte, N.C.
Filed Oct. 23, 1987, Ser. No. 112,757
Term of patent 14 years
U.S. Cl. D12—155



308,037
COMBINED VEHICLE BUMPER AND GUARD
Keith R. Aiken, P.O. Box 276, Campbelltown, New South Wales, Australia
Filed Jul. 7, 1987, Ser. No. 70,519
Claims priority, application Australia, Feb. 3, 1987, 0322/87
Term of patent 14 years
U.S. Cl. D12—169

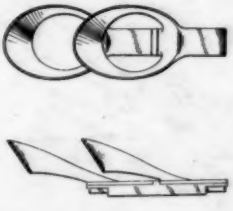


308,038
TIRE
Warren L. Guidry, Rayne, La., assignor to Interco Tire Corporation, Rayne, La.
Filed Aug. 13, 1987, Ser. No. 84,747
Term of patent 14 years
U.S. Cl. D12—146

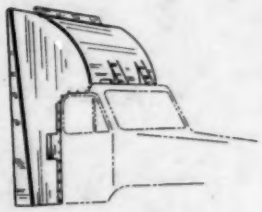


308,039
TRACTION MAT FOR ATTACHMENT TO A VEHICLE TIRE
Reginald C. L. Ellis, Rose Cottage, School Hill, Upper Lydbrook, Gloucestershire, England
Filed Dec. 29, 1987, Ser. No. 139,272
Claims priority, application United Kingdom, Jul. 3, 1987, 1043232
Term of patent 14 years
U.S. Cl. D12—154

308,040
AUTOMOBILE WINDSHIELD WIPER AID
Victor Colani, Norderstedt, Fed. Rep. of Germany, assignor to Bonatrade International, Inc., Santa Ana, Calif.
Filed Sep. 9, 1987, Ser. No. 94,920
Term of patent 14 years
U.S. Cl. D12—155

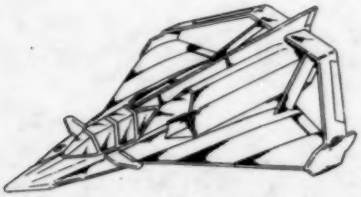


308,041
AIR SPOILER FOR TRUCKS
James R. Land, Champlin, Minn., assignor to Land Industries, Inc., Minneapolis, Minn.
Filed May 12, 1986, Ser. No. 862,558
Term of patent 14 years
U.S. Cl. D12—181

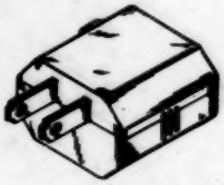


308,042
WATERCRAFT STABILIZING FLOTATION STRUCTURE
William M. Kitner, 4425 Palos Verdes Dr. North, Rolling Hills Estates, Calif. 90274; Thomas J. Calamia, 4507 Whitney, El Monte, Calif. 91731, and James R. Keshey, 7834 La Mirada Cir., Buena Park, Calif. 90620
Filed Feb. 17, 1987, Ser. No. 15,722
Term of patent 14 years
U.S. Cl. D12—317

308,043
AIRCRAFT
Gerald L. Butler, P.O. Box 150163, Arlington, Tex. 76015
Filed Sep. 8, 1987, Ser. No. 93,902
Term of patent 14 years
U.S. Cl. D12—342

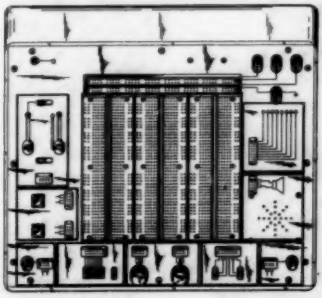


308,044
TRANSFORMER HOUSING
Bill B. Chandler, 965 Broadview Pl., Colorado Springs, Colo. 80904
Filed Oct. 14, 1988, Ser. No. 257,774
Term of patent 14 years
U.S. Cl. D13—110

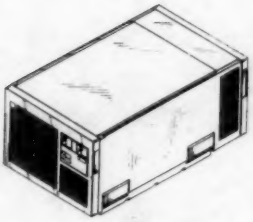


308,045
COMBINED FACE PLATE AND CONTROL OPERATORS FOR AN ELECTRICAL SWITCH OR SIMILAR ARTICLES
Richard C. Counts, Dallas, and David Flegenschue, Irving, both of Tex., assignors to Prescolite Inc., San Leandro, Calif.
Filed May 6, 1987, Ser. No. 47,701
Term of patent 14 years
U.S. Cl. D13—170

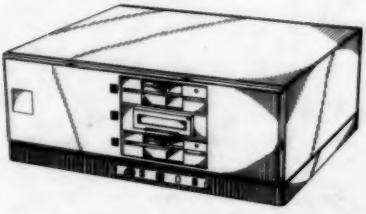
308,046
ELECTRONIC CIRCUIT SETUP STATION
Robert A. Melone, North Haven, Conn., assignor to Interplex Electronics, Inc., New Haven, Conn.
Filed Nov. 12, 1986, Ser. No. 929,766
The portion of the term of this patent subsequent to Dec. 5, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D13—164



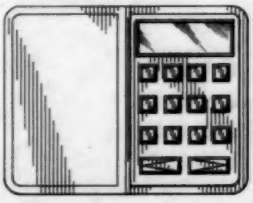
308,047
DATA PROCESSOR
Wayne L. Aderman, Rochester, Minn.; Vincent S. Garmon, West Palm Beach, Fla.; Timothy J. Rodd, Lyndhurst, England, and Robert P. Tennant, Endicott, N.Y., assignors to International Business Machines Corp., Armonk, N.Y.
Filed Oct. 6, 1987, Ser. No. 105,163
Term of patent 14 years
U.S. Cl. D14—100



308,048
PERSONAL COMPUTER
Ettore Sottsass, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy
Filed Dec. 14, 1987, Ser. No. 132,145
Claims priority, application Italy, Jun. 22, 1987, 53455/87[U]
Term of patent 14 years
U.S. Cl. D14—100

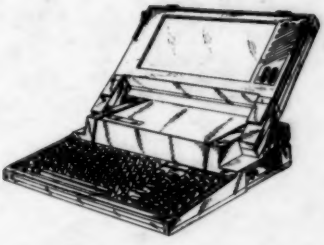


308,049
HANDHELD REFERENCE COMPUTER
Carol J. Dennett, 430 Akron, Augusta, Kans. 67010
Filed Mar. 7, 1988, Ser. No. 164,711
Term of patent 14 years
U.S. Cl. D14—100

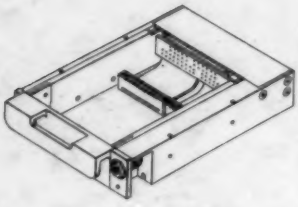


308,050
ELECTRONIC COMPUTER
Yoshihiko Sagano, Tokyo, and Takaharu Andou, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Dec. 8, 1987, Ser. No. 130,157
Claims priority, application Japan, Aug. 3, 1987, 62-31261
Term of patent 14 years
U.S. Cl. D14—106

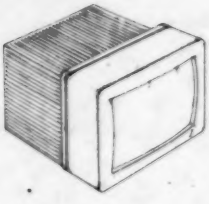
308,051
PORTABLE COMPUTER
Hiroaki Sakai, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan
Filed Dec. 18, 1987, Ser. No. 135,100
Claims priority, application Japan, Jun. 29, 1987, 62-26389
Term of patent 14 years
U.S. Cl. D14—106



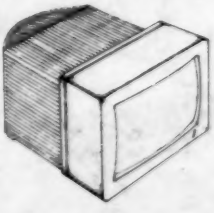
308,052
LOCKABLE AND REMOVABLE SLIDEIN ASSEMBLY FOR A HARD DISK DRIVE
Julius C. Darden, 1733 Calle Artigas, Thousand Oaks, Calif. 91360; Miguel M. L. Praca, 615 Ocean Front Walk, Apt. 203, Venice, Calif. 90291, and Philip J. Tomasi, 205 Pepper St., Newbury Park, Calif. 91301
Filed Oct. 1, 1987, Ser. No. 103,572
Term of patent 14 years
U.S. Cl. D14—109



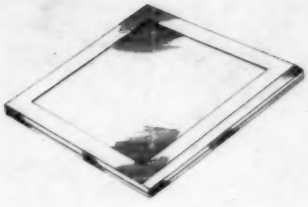
308,053
VIDEO DISPLAY FOR COMPUTER
Stephen Peart, Los Gatos, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.
Filed Mar. 17, 1987, Ser. No. 26,559
Term of patent 14 years
U.S. Cl. D14—113



308,054
VIDEO DISPLAY FOR COMPUTER
Stephen Peart, Los Gatos, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.
Filed Mar. 17, 1987, Ser. No. 26,560
Term of patent 14 years
U.S. Cl. D14—113

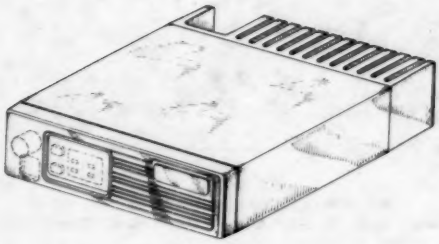


308,055
DIGITIZING TABLET FOR COMPUTER INPUT
Thomas A. Tedham, Salem, and Kenichi Akagi, Littleton, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.
Filed Oct. 20, 1988, Ser. No. 260,547
Term of patent 14 years
U.S. Cl. D14—114

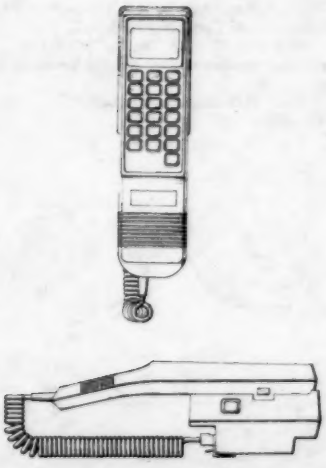


308,056
HUB FOR A TAPE REEL
Yuka Takeda, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Dec. 18, 1987, Ser. No. 134,903
Claims priority, application Japan, Jun. 5, 1987, 62-23139
Term of patent 14 years
U.S. Cl. D14—121

308,057
HOUSING FOR A TWO-WAY MOBILE RADIO OR SIMILAR ARTICLE
Masaru Tokiyama, Arlington, Tex., assignor to Motorola Inc., Schaumburg, Ill.
Filed Dec. 28, 1987, Ser. No. 138,529
Term of patent 14 years
U.S. Cl. D14—137

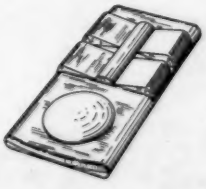


308,058
MOBILE TELEPHONE SET
Minoru Hotsumi, and Toshiaki Mizushima, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Dec. 27, 1988, Ser. No. 290,731
Claims priority, application Japan, Jun. 24, 1988, 63-25306
Term of patent 14 years
U.S. Cl. D14—138

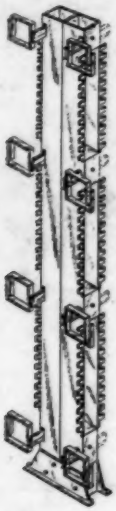


308,059
TELEPHONE BASE UNIT
Gus E. Desbarats, Putney, England, assignor to British Telecommunications public limited company, London, United Kingdom
Filed Sep. 26, 1988, Ser. No. 249,636
Claims priority, application United Kingdom, May 20, 1988, 1050886
The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—151

308,060
REMOTE CONTROL FOR A CAR RADIO RECEIVER
Grant M. N. Davidson, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jul. 7, 1988, Ser. No. 216,742
Claims priority, application United Kingdom, Jan. 20, 1988, 1.047.819
Term of patent 14 years
U.S. Cl. D14—218

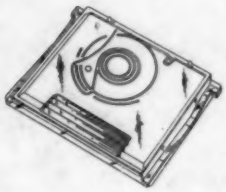


308,061
TELEPHONE MAIN FRAME MODULE OR SIMILAR ARTICLE
Paul V. De Luca, Pleasdome Manor, N.Y., assignor to Porta Systems Corp., Syosset, N.Y.
Filed Jun. 3, 1987, Ser. No. 57,051
Term of patent 14 years
U.S. Cl. D14—240

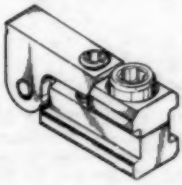


308,062
SHOULDER REST HOLDER FOR A PORTABLE TELEPHONE HANDSET
Kathleen C. Leoni; Michael D. Barron, both of P.O. Box 3116, Flint, Mich. 48502, and Robby D. Johnson, 351 Elm St., Mt. Morris, Mich. 48458
Filed Jun. 24, 1988, Ser. No. 211,039
Term of patent 14 years
U.S. Cl. D14—253

308,063
SLIDE PLATE OF A SEWING MACHINE
Masatomo Amemiya, Hachioji, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan
Filed Feb. 17, 1987, Ser. No. 15,272
Claims priority, application Japan, Aug. 22, 1986, 32471
Term of patent 14 years
U.S. Cl. D15—72

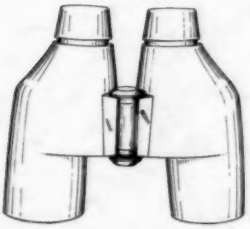


308,064
WORKPIECE CLAMP FOR FLAT BED JIG
Jimmy Hsieh, 65, Sec. 3 Chung Ching N. Road, Taipei 10316, Taiwan
Filed Apr. 13, 1987, Ser. No. 37,401
Term of patent 14 years
U.S. Cl. D15—138

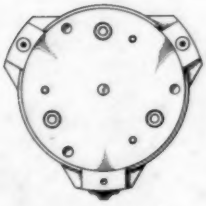


308,065
EYEGLASS FRAME
Ulrich J. Haas, Vienna, Austria, assignor to Optyl Eyewear Fashion International Corp., Norwood, N.J.
Filed Jan. 25, 1988, Ser. No. 147,917
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1987, 17,322
Term of patent 14 years
U.S. Cl. D16—102

308,066
PAIR OF BINOCULARS
Claus O. Huckenbeck, Star Rte. 3, P.O. Box 4625-11, Tehachapi, Calif. 93561
Filed Oct. 28, 1988, Ser. No. 265,433
Term of patent 14 years
U.S. Cl. D16—133

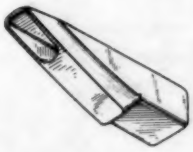


308,067
ROTARY MOUNT FOR A TELESCOPE OR THE LIKE
Howard Mednick, 16518 Dearborn St., Sepulveda, Calif. 91343
Filed Feb. 9, 1987, Ser. No. 12,302
Term of patent 14 years
U.S. Cl. D16—145

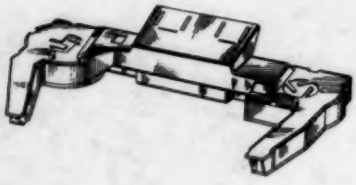


308,068
PIANO
Steffen Seiler, Kitzingen-Hohenfeld, Fed. Rep. of Germany, assignor to Ed. Seiler Pianofortefabrik GmbH & Co KG, Kitzingen, Fed. Rep. of Germany
Filed Jul. 7, 1987, Ser. No. 70,485
Claims priority, application Fed. Rep. of Germany, Jan. 7, 1987, MR II/759
Term of patent 14 years
U.S. Cl. D17—8

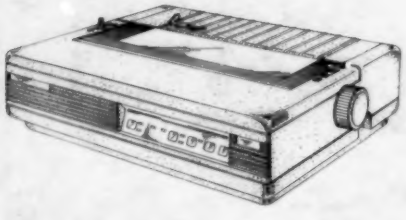
308,069
WOODWIND MOUTHPIECE
William P. Disers, 555 Westminster St., Joliet, Ill. 60435
Filed Apr. 14, 1987, Ser. No. 38,343
Term of patent 14 years
U.S. Cl. D17—13



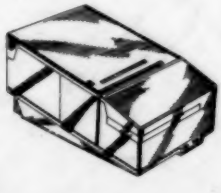
308,070
RIBBON CASSETTE
Hans W. Mueller, and Kenneth D. Vought, both of Cortland, N.Y., assignors to Smith Corona Corporation, N.Y.
Filed Nov. 30, 1987, Ser. No. 127,002
Term of patent 14 years
U.S. Cl. D18—12



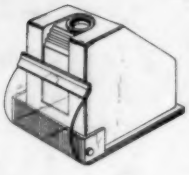
308,071
PRINTER
David S. Urbanus, North Easton, Mass., and Walter E. Lufkin, Londonderry, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.
Filed Mar. 6, 1987, Ser. No. 23,065
Term of patent 14 years
U.S. Cl. D18—13



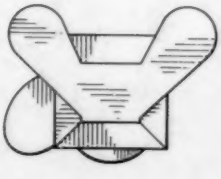
308,072
PRINTER
Duane L. Salmonson, Riverton, Wyo., assignor to Micro Peripherals, Inc., San Diego, Calif.
Filed Apr. 6, 1987, Ser. No. 34,187
Term of patent 14 years
U.S. Cl. D18—13



308,073
TONER TANK
Yoko Nakamura, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Oct. 21, 1988, Ser. No. 260,663
Claims priority, application Japan, Apr. 21, 1988, 63-16139
Term of patent 14 years
U.S. Cl. D18—43

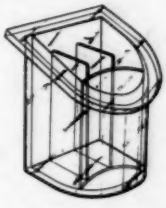


308,074
GREETING CARD
William P. Warkentin, 14 Turner Crescent, St. Catharines, Ontario, Canada (L2P 2H6)
Filed Oct. 26, 1987, Ser. No. 114,255
Claims priority, application Canada, Apr. 27, 1987, 27-04-87-6
Term of patent 14 years
U.S. Cl. D19—1

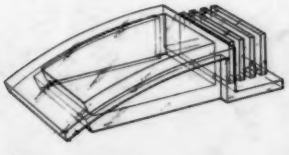


308,075
MARKING PEN
Katsuhiko Yazaki, Urawa, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan
Filed May 11, 1987, Ser. No. 49,442
Term of patent 14 years
U.S. Cl. D19—43

308,076
HOLDER FOR WRITING INSTRUMENTS
Bruno Gecchelin, Milan, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Jul. 15, 1987, Ser. No. 73,421
Claims priority, application Italy, Jan. 20, 1987, 20544/87[U]
Term of patent 14 years
U.S. Cl. D19—85

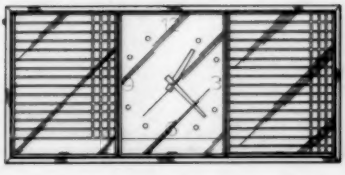


308,077
PAPER HOLDER
Bruno Gecchelin, Milan, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Jul. 15, 1987, Ser. No. 73,422
Claims priority, application Italy, Jan. 20, 1987, 20543/87[U]
Term of patent 14 years
U.S. Cl. D19—90



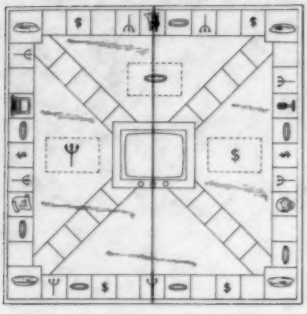
308,078
ADVERTISING SIGN ADAPTED FOR INSTALLATION AT A CHECK-OUT COUNTER
Fred H. Dallal, Hartsdale, and Milton Glaser, New York, both of N.Y., assignors to Media Holdings, Inc., New York, N.Y.
Filed Dec. 9, 1987, Ser. No. 130,726
Term of patent 14 years
U.S. Cl. D20—10

308,079
ILLUMINATED MENU DISPLAY UNIT
John M. Brown, 2600 Lockheed Way, Carson City, Nev. 89701
Filed Mar. 28, 1988, Ser. No. 174,617
Term of patent 14 years
U.S. Cl. D20—20



308,080
IDENTIFICATION TAG
Isaac Sachs, 1240 Ridgewood Drive, Chomedey, Laval, Quebec, Canada (H7W 1L3)
Continuation-in-part of Ser. No. 820,965, Jan. 22, 1986. This application Aug. 26, 1988, Ser. No. 236,778
Term of patent 14 years
U.S. Cl. D20—22

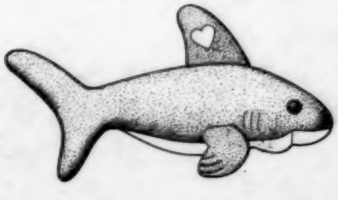
308,081
GAMEBOARD
Fred B. Wrixon, 214 N. 7th St., Martins Ferry, Ohio 43935
Filed Jul. 23, 1987, Ser. No. 76,656
Term of patent 14 years
U.S. Cl. D21—25



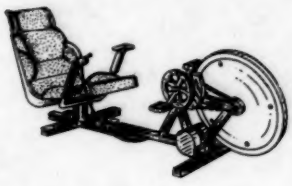
308,082
RATTLE
Rita Raiffe, Far Hills, N.J., assignor to Gund, Inc., Edison, N.J.
Filed Jan. 28, 1988, Ser. No. 150,317
Term of patent 14 years
U.S. Cl. D21—65

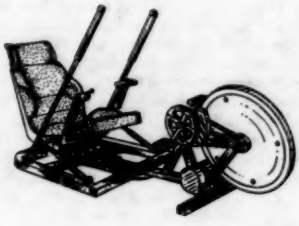
308,083
FLEXIBLE VEHICLE-LIKE CHILD'S TOY
Danny G. Freeman, Rte. 3, Box 364, Dawson Springs, Ky. 42408
Filed Sep. 5, 1986, Ser. No. 904,229
Term of patent 14 years
U.S. Cl. D21—124

308,084
STUFFED TOY SHARK
Melanie M. Smith, and William M. Smith, both of 1630 Whitewood Ct., #A, Corona, Calif. 91720
Filed Mar. 9, 1987, Ser. No. 23,281
Term of patent 14 years
U.S. Cl. D21—157

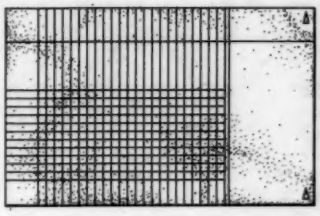


308,085
BICYCLE EXERCISER
Terry D. Alberts, Sunset Beach, Calif., assignor to Pro-Tec Sports International, Inc., Compton, Calif.
Filed Apr. 11, 1988, Ser. No. 180,252
Term of patent 14 years
U.S. Cl. D21—194





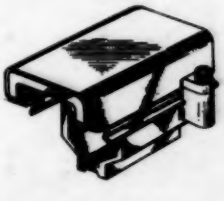
308,087
GOLF PRACTICE MAT
Peter D. Buffey, 26 Lafayette La., Norfolk, Mass. 02054
Filed May 18, 1987, Ser. No. 51,150
Term of patent 14 years
U.S. Cl. D21—234



308,088
SANDBOX
James F. Mariol, Cincinnati, Ohio, assignor to The Little Tikes Company, Hudson, Ohio
Filed Apr. 17, 1987, Ser. No. 39,527
Term of patent 14 years
U.S. Cl. D21—252

308,086
GOLF TEE
Robert Mc. Gamble, 450 N. Barfield Dr., Marco, Fla. 33937
Filed Jun. 8, 1987, Ser. No. 59,871
Term of patent 14 years
U.S. Cl. D21—208

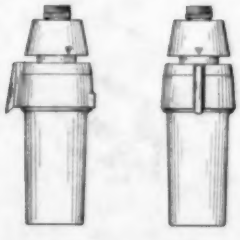
308,089
SIGHT AIMING INSTRUMENT FOR WEAPONRY
Ronald J. Sanders, P.O. Box 658, Floodwood, Minn. 55736
Filed Dec. 4, 1987, Ser. No. 128,570
Term of patent 14 years
U.S. Cl. D22—109



308,090
COMBINED FISHING REEL AND BAIT CASE
Shih-Yuan Yeh, No. 2-4, Chen-Hsing Road, Tai-Ping Hsiang, Taichung Hsien, Taiwan
Filed Jun. 2, 1987, Ser. No. 57,245
Term of patent 14 years
U.S. Cl. D22—139

308,091
FISH HOOK REMOVER
James D. Sprague, 505 High St., Edwardsville, Kans. 66111
Filed Feb. 18, 1987, Ser. No. 15,877
Term of patent 14 years
U.S. Cl. D22—149

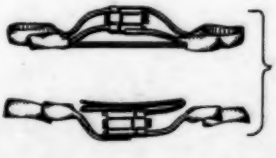
308,092
FAUCET FILTER
Francois Geneve; Luc Heiligenstein, and Stephen Melamed, all of Chicago, Ill., assignors to Associated Mills Inc., Chicago, Ill.
Filed Dec. 30, 1988, Ser. No. 292,560
Term of patent 14 years
U.S. Cl. D23—209



308,093
HAND HELD SPRAY
Loran R. Hill, Indianapolis, and Anthony G. Spangler, Sheridan, both of Ind., assignors to Masco Corporation of Indiana, Taylor, Mich.
Filed Feb. 10, 1988, Ser. No. 154,674
Term of patent 14 years
U.S. Cl. D23—226

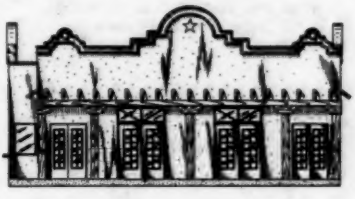
308,094
COMBINED HANDLE-OPERATED FLOW CONTROL VALVE AND PRESSURE GAUGE
Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060
Continuation of Ser. No. 68,052, Jun. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 15,604, Feb. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 674,272, Nov. 23, 1984, Pat. No. Des. 293,127, which is a continuation-in-part of Ser. No. 461,874, Jan. 28, 1983, Pat. No. Des. 282,392, which is a division of Ser. No. 756,186, Jul. 18, 1985, Pat. No. Des. 284,301. This application Jul. 26, 1988, Ser. No. 224,250
Term of patent 14 years
U.S. Cl. D23—226

308,095
ORTHODONTIC APPLIANCE
John A. Collins, Jr., 1116 Mishawaka Ave., South Bend, Ind. 46615
Filed Jan. 4, 1988, Ser. No. 140,322
Term of patent 14 years
U.S. Cl. D24—10

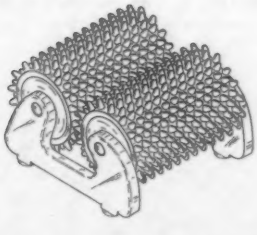


308,096
ORTHODONTIC FACE MASK
John A. Collins, Jr., 1116 Mishawaka Ave., South Bend, Ind. 46615
Filed Jan. 4, 1988, Ser. No. 140,437
Term of patent 14 years
U.S. Cl. D24—10

308,097
FAST SERVICE RESTAURANT BUILDING
Robert W. McMahon, San Antonio, Tex., assignor to Third R.W.M., Inc., San Antonio, Tex.
Filed Aug. 1, 1988, Ser. No. 226,972
Term of patent 14 years
U.S. Cl. D25—1



308,098
MASSAGE ROLLER
Arvo E. Lievonen, and Kari J. Lievonen, both of 1301 Lake Geneva Dr., Lake Worth, Fla. 33461
Filed Apr. 30, 1987, Ser. No. 45,661
Term of patent 14 years
U.S. Cl. D24—36

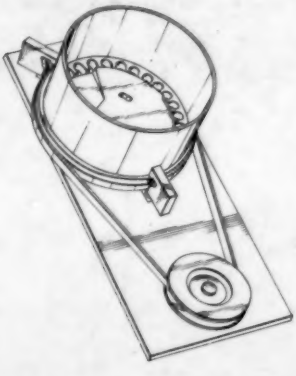


308,099
CATHETER BAG SUPPORT HOOK OR SIMILAR ARTICLE
Louis M. Jimenez, P.O. Box 1916, Oroville, Calif. 95965-1916
Filed Nov. 9, 1989, Ser. No. 433,734
Term of patent 14 years
U.S. Cl. D24—54

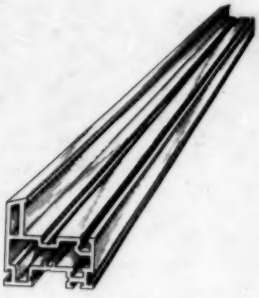
308,100
NASAL SPRAY PUMP
Keith A. Bishop, River Vale, and William S. Blake, Linwood, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.
Filed Aug. 28, 1987, Ser. No. 90,734
Term of patent 14 years
U.S. Cl. D24—62

308,101
ORAL MEDICAMENT DISPENSER FOR LIQUID OR CREAM
Edward Tugwood, Iver Heath, United Kingdom, assignor to Plough, Inc., Del.
Filed Mar. 25, 1987, Ser. No. 30,782
Claims priority, application United Kingdom, Sep. 26, 1986, 1037195
Term of patent 14 years
U.S. Cl. D24—63

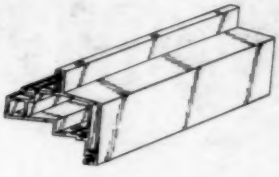
308,102
BULLET COLLATOR FOR SHELL RELOADING OPERATIONS
Ralph D. Pickens, 49162 McCoy Ave., East Liverpool, Ohio 43920
Filed May 15, 1987, Ser. No. 49,780
Term of patent 14 years
U.S. Cl. D25—116



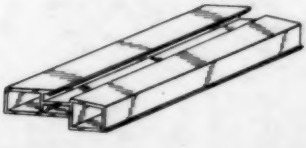
308,103
WINDOW COMPONENT EXTRUSION
Dennis Westphal, Galva, and Jonathan Piles, McPherson, both of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.
Filed Sep. 19, 1988, Ser. No. 246,187
Term of patent 14 years
U.S. Cl. D25—124



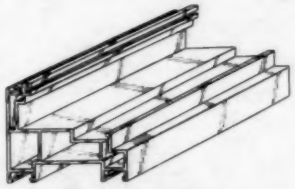
308,104
WINDOW COMPONENT
Terence Hardy, Derby, England, assignor to L. B. Plastics Limited, England
Filed Aug. 10, 1989, Ser. No. 392,252
Term of patent 14 years
U.S. Cl. D25—124



308,105
WINDOW COMPONENT
Terence Hardy, Nether Heage, England, assignor to L. B. Plastics Limited, England
Filed Aug. 10, 1989, Ser. No. 392,253
Term of patent 14 years
U.S. Cl. D25—124

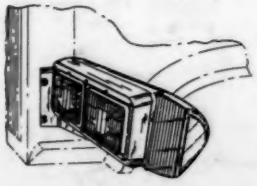


308,106
WINDOW COMPONENT
Terence Hardy, Derby, England, assignor to L. B. Plastics Limited, England
Filed Aug. 10, 1989, Ser. No. 392,254
Term of patent 14 years
U.S. Cl. D25—124

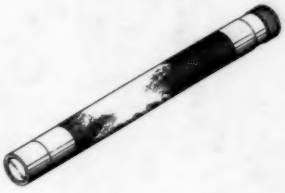


308,107
SQUARED STAIRCASE BALUSTER
Louis Manzo, 8 Putnam Ct., Holmdel, N.J. 07733
Filed Nov. 6, 1987, Ser. No. 117,732
Term of patent 14 years
U.S. Cl. D25—126

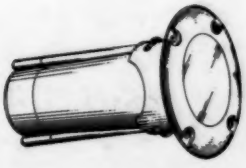
308,108
HEADLIGHT FOR A TRUCK
Ross Sasamura, Fremont, Calif., assignor to Paccar Inc., Bellevue, Wash.
Filed Sep. 11, 1987, Ser. No. 96,142
Term of patent 14 years
U.S. Cl. D26—35



308,109
FLASHLIGHT
Anthony Maglica, Ontario; Robert J. DeLong, Temple City, and Armis L. Lewis, Cucamonga, all of Calif., assignors to Mag Instrument, Inc., Ontario, Calif.
Filed Apr. 27, 1987, Ser. No. 43,596
Term of patent 14 years
U.S. Cl. D26—49



308,110
LUFF LIGHT FOR A BOAT
Theodore Ziaylek, Jr., 140 Riverview Dr., Yardley, Pa. 19067
Filed Mar. 27, 1987, Ser. No. 30,784
The portion of the term of this patent subsequent to Mar. 20, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D26—36

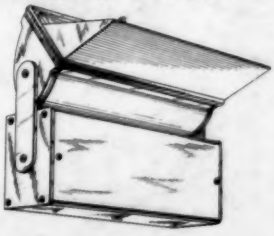


308,111
OUTDOOR LIGHT FIXTURE
Eugene D. Banathy, Skokie; Augustus B. Davis, Mundelein, and David A. Carlson, Lindenhurst, all of Ill., assignors to Intermatic Electronics, Incorporated, Spring Grove, Ill.
Filed Jun. 18, 1987, Ser. No. 64,775
Term of patent 14 years
U.S. Cl. D26—68

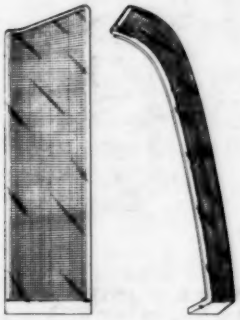
308,112
INDIRECT LIGHT FIXTURE
Giampaolo Targetti, Florence, Italy, assignor to Targetti Sankey, S.p.A., Florence, Italy
Filed Mar. 19, 1987, Ser. No. 27,676
Term of patent 14 years
U.S. Cl. D26—72

308,113
DECORATIVE WALL LAMP
Leonard O. Lewis, Jr., 32 Willow St., Port Monmouth, N.J. 07758
Filed Sep. 3, 1987, Ser. No. 92,714
Term of patent 14 years
U.S. Cl. D26—73

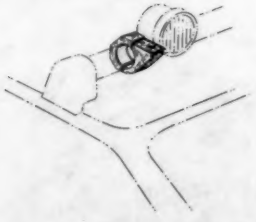
308,114
WALL MOUNTED INDIRECT LIGHTING FIXTURE
Sylvan R. Shemitz, Woodbridge, Conn., assignor to Sylvan R. Shemitz Associates, Inc., West Haven, Conn.
Filed Apr. 9, 1987, Ser. No. 36,845
Term of patent 14 years
U.S. Cl. D26—35



308,115
PAIR OF VEHICLE REAR SIGNAL LIGHTS
Carmelo Vitale, Mozzate, and Ezio Villa, Arese, both of Italy, assignors to Alfa Lancia Industriale S.p.A., Arese, Italy
Filed Feb. 26, 1988, Ser. No. 160,927
Term of patent 14 years
U.S. Cl. D26—122

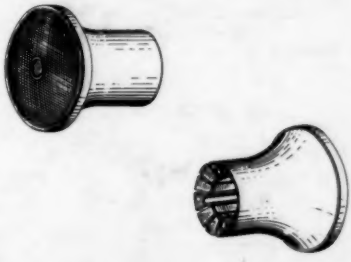


308,116
VEHICLE LIGHT MOUNTING BRACKET
Robert R. Vandergriff, 4200 Via Dolce (334), Marina Del Rey, Calif. 90291
Filed Jan. 26, 1988, Ser. No. 149,059
Term of patent 14 years
U.S. Cl. D26—149

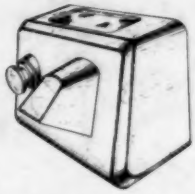


308,117
HOT LATHER MACHINE
James L. Badgett, Atlanta, Ga., assignor to Conair Corporation, Stamford, Conn.
Filed Sep. 6, 1988, Ser. No. 240,573
Term of patent 14 years
U.S. Cl. D28—9

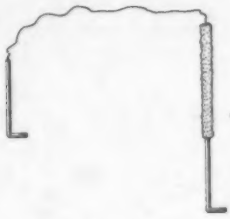
308,118
DIFFUSER ATTACHMENT FOR HAIR DRYER
Richard H. Brill, Philadelphia, Pa., assignor to Conair Corporation, Stamford, Conn.
Filed Jul. 5, 1988, Ser. No. 215,902
Term of patent 14 years
U.S. Cl. D28—18



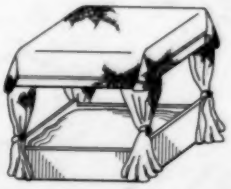
308,119
DRYER
Lorin R. Wigman, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Nov. 2, 1988, Ser. No. 266,032
Term of patent 14 years
U.S. Cl. D28—54.1



308,120
COMBINED DENTAL FLOSS AND HANDLES THEREFOR
Jan Monheim, 6087 Wadsworth Rd., Orrville, Ohio 44667
Filed Mar. 14, 1988, Ser. No. 167,421
Term of patent 14 years
U.S. Cl. D28—64



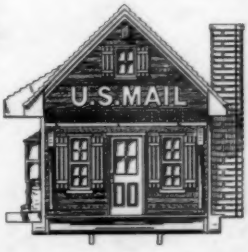
308,121
WATERBED FOR PETS OR THE LIKE
Geraldine M. Overturf, 653 24th South West, Loveland, Colo. 80537
Filed May 22, 1987, Ser. No. 52,954
Term of patent 14 years
U.S. Cl. D30—118



308,122
PET TOY
Joseph P. Markham, and Peter Emily, both of Lakewood, Colo., assignors to Bounce, Inc., Lakewood, Colo.
Continuation-in-part of Ser. No. 73,432, Jul. 15, 1987. This application Feb. 1, 1988, Ser. No. 151,247
Term of patent 14 years
U.S. Cl. D30—160

308,123
VEHICLE AIR DRYING NOZZLE
Graham J. Astley, Novi, and Barry S. Turner, Livonia, both of Mich., assignors to Belanger, Inc., Northville, Mich.
Filed Apr. 1, 1987, Ser. No. 32,652
Term of patent 14 years
U.S. Cl. D32—4

308,124
MAILBOX
Thomas F. Janzer, Bensalem, Pa., assignor to The Janzer Corp., Bensalem, Pa.
Filed Sep. 17, 1986, Ser. No. 908,173
Term of patent 14 years
U.S. Cl. D99—30



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PATENTS WERE ISSUED ON THE 22ND DAY OF MAY, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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A. E. Staley Manufacturing Company: *See*—
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A. O. Smith Corporation: *See*—
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Abbott, Kenneth E.; Lyons, Patrick J.; and Satariano, Richard M., to Stripping Technologies Inc. Pressurized hose handle with system controls. 4,926,589, Cl. 51-427.000.

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Pastrone, John; and Laenen, Edward, 4,927,411, Cl. 604-65.000.
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Takase, Haruo; Uenaka, Kazushige; Abe, Akira; and Fujita, Yoshihiro, 4,927,533, Cl. 210-257.100.

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Abe, Yasunao: *See*—
Kondo, Masao; and Abe, Yasunao, 4,926,738, Cl. 84-618.000.

Abele, Alan C.: *See*—
Haire, Allen; Abele, Alan C.; and Kuczek, Stanley W., 4,927,355, Cl. 431-329.000.

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Henriksson, Bengt-Ake, 4,927,094, Cl. 242-242.000.

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Levatter, Jeffrey I., 4,927,231, Cl. 350-96.320.

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Duback, David W.; and Vogenthaler, James R., 4,928,205, Cl. 361-346.000.

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Gattey, Phillip; and Chen, Shu-Ren, 4,926,961, Cl. 181-22.000.
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Adams, Frederic R.; Boyer, Jeffrey M.; Schultz, Ronald N.; and Taylor, Barry, to Saturn Corporation. Operator control for vehicle components. 4,926,959, Cl. 180-315.000.

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Zoltan, Bart J.; Laube, Beth L.; and Adams, George K., III, 4,926,852, Cl. 128-200.230.

Adams, Ronald L.; Kimbel, Kirk L.; and Quinn, Clayton B., to General Electric Company. Filled core materials having unfilled outer attached layers. 4,927,675, Cl. 428-35.900.

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Blondeau, Ernest E., Jr.; and Czarnecki, Stephen J., 4,928,276, Cl. 370-110.100.

Agar, David: *See*—
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Arai, Hirohiko; and Tachi, Susumu, 4,928,047, Cl. 318-568.160.

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Agharkar, Shreeram N.: *See*—
Bykadi, Gururaj; Kaplan, Murray A.; Corrao, Richard G.; Bara, Edward J.; Ullah, Ismat; and Agharkar, Shreeram N., 4,927,638, Cl. 424-455.000.

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Scully, Marlan O., 4,927,419, Cl. 604-892.100.

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Aishin Seiki Co., Ltd.: *See*—
Tsumura, Kenji; Yamada, Yukifumi; and Terada, Takami, 4,927,110, Cl. 248-430.000.

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Arakawa, Yoshichika, 4,926,711, Cl. 475-227.000.
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Kaneuchi, Kunihiro; Yasuda, Seigou; Ariyoshi, Takashi; Nakatani, Tomofumi; and Aizawa, Hiroshi, 4,928,302, Cl. 379-88.000.
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Grabbe, Dimitry G.; and Schnoor, William J., 4,927,369, Cl. 439-66.000.
Gutter, David H., 4,927,388, Cl. 439-660.000.
Hopkins, John R.; Manning, Randy M.; and Marusak, Stephen A., 4,926,548, Cl. 29-860.000.
Pitts, Robert W., 4,927,374, Cl. 439-310.000.

AMPER, S.A.: *See—*
Martin, Emilio B., 4,927,031, Cl. 209-657.000.

Amphenol Socapex: *See—*
Kayoun, Pierre; and Pouyez, Philippe, 4,928,135, Cl. 350-96.200.

Amsted Industries Incorporated: *See—*
Spencer, Charles P., 4,926,757, Cl. 105-224.100.
Springman, Charles G., 4,927,002, Cl. 198-487.100.

Analgesic Associates: *See—*
Sunshine, Abraham; and Laska, Eugene M., 4,927,854, Cl. 514-570.000.

Analog Devices, Inc.: *See—*
Lane, Charles D., 4,928,103, Cl. 341-159.000.

Analogic Corporation: *See—*
Gordon, Bernard M., 4,928,283, Cl. 378-20.000.

Anderson, Conroy D.; Chou, Tai-Sheng; Cormier, William E., Jr.; Dwyer, Francis G.; Krambeck, Frederick J.; Pasquale, Gary M.; Schipper, Paul H.; and Stover, William A., to Mobil Oil Corporation. Octane improvement of gasoline in catalytic cracking without decreasing total liquid yield. 4,927,526, Cl. 208-152.000.

Anderson, Leonard M.: *See—*
Howarth, John; and Anderson, Leonard M., 4,928,013, Cl. 250-339.000.

Andonov, Blagoy A., to N I T I "Veda". Flamme fancy yarn manufacturing method and apparatus. 4,926,626, Cl. 57-18.000.

Andorsen, John P. Device for cleaning surfaces, particularly in water. 4,926,775, Cl. 114-222.000.

Andrews, Gary M.: *See—*
Cutcher, John A.; and Andrews, Gary M., 4,927,550, Cl. 252-32.500.

Andrews, Gordon T.: *See—*
Parker, Christopher; and Andrews, Gordon T., 4,926,837, Cl. 126-21.00H.

Andros, Andrew A.; and Campana, Thomas J., to Telefind Corporation. Paging receiver for receiving pages from analog or digital paging transmitters. 4,928,100, Cl. 340-825.440.

Anemaet, John M.: *See—*
Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.

Angewandte Digital Electronik GmbH: *See—*
Kreft, Hans-Diedrich; MacKenthun, Holger; and Hass, Wolfgang, 4,928,087, Cl. 340-825.710.

Anritsu Corporation: *See—*
Sugiura, Itsuo; Nishida, Yutaka; Ito, Kaoru; and Ozaki, Toshiyuki, 4,927,266, Cl. 356-243.000.

Anson, Donald, to Battelle Memorial Institute. Rotating drum filter. 4,927,435, Cl. 55-96.000.

Antaki, James M.; and Layne, Daniel T., III, to Clorox Company, The. Reduced tartness salad dressing. 4,927,657, Cl. 426-589.000.

Antell, George R.: *See—*
Pitt, Gilles D.; Jones, Roger E.; Antell, George R.; Spicer, Lyndon R.; Barnett, John A.; and Hill, Robert, 4,928,319, Cl. 455-612.000.

Antenucci, Robert N., to A. E. Staley Manufacturing Company. Method of making a hemicellulose coated dietary fiber. 4,927,649, Cl. 426-273.000.

Antonio, Franklin P.: *See—*
Gilhousen, Klein S.; and Antonio, Franklin P., 4,928,274, Cl. 370-92.000.

Antos, John M.: *See—*
Sargent, Charles L.; Antos, John M.; and Biba, Scott L, 4,926,508, Cl. 4-329.000.

Anzai, Hisao; Makino, Hideaki; Ootani, Masami; Sasaki, Isao; and Nishida, Kozi, to Mitsubishi Rayon Co., Ltd. Process for producing methacrylimide group-containing polymer. 4,927,893, Cl. 525-378.000.

Aoki, Kazuo; Chiba, Toshimi; Tachibana, Sadao; and Nagatomo, Yasushi, to Oki Electric Industry Co., Ltd. Spring-biased push-button switch having a spring-loaded tactile feedback feature. 4,927,990, Cl. 200-517.000.

Aoki, Kenji; Nagata, Mitsuo; Nakamura, Haruo; and Miura, Teiji, to Seiko Epson Corporation. Dual frequency, optically active liquid crystal cell. 4,927,242, Cl. 350-346.000.

Aoki, Mitsuo: *See—*
Isoda, Tetsuo; Watanabe, Yoichiro; Nakayama, Nobuhiro; and Aoki, Mitsuo, 4,927,728, Cl. 430-108.000.

Aoki, Satoshi: *See—*
Kudoh, Noboru; Hirukawa, Itsushi; Aoki, Satoshi; Yoshimura, Tsuyoshi; and Shiozawa, Shigeki, 4,927,390, Cl. 440-88.000.

Aoki, Tomoyuki: *See—*
Matsushima, Yasunobu; Tanaka, Shigeo; Aoki, Tomoyuki; and Ono, Yohji, 4,927,472, Cl. 148-261.000.

Applied Materials, Inc.: *See—*
Cheng, David; Hartlage, Robert P.; and Zhang, Wesley W., 4,927,485, Cl. 156-345.000.

Applied Power Inc.: *See—*
Brumme, Reinhold; and Desons, Roger, 4,927,122, Cl. 267-140.100.

Arai, Hajime; and Harada, Hrioshi, to Mitsubishi Denki Kabushiki Kaisha. Method for fabricating semiconductor device. 4,927,783, Cl. 437-196.000.

Arai, Hirohiko; and Tachi, Susumu, to Agency of Industrial Science & Technology, Ministry of International Trade. Manipulator and control method. 4,928,047, Cl. 318-568.160.

Arai, Minoru; and Katoh, Yukihiro, to Iwatsu Electric Co., Ltd. DC amplifier. 4,928,073, Cl. 330-252.000.

Arai, Takaaki: *See—*
Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, 4,926,906, Cl. 137-625.300.

Arakawa, Yoshichika, to Aisin Seiki Kabushiki Kaisha. Worm gear type differential mechanism. 4,926,711, Cl. 475-227.000.

Aramaki, Minoru; Sakaguchi, Hiroaki; and Nakamura, Tamio, to Central Glass Company, Limited. Process of preparing fluorocarbon carboxylic or sulfonic acid from its fluoride. 4,927,962, Cl. 562-113.000.

Arbesmeier, Bernhard: *See—*
Muller, Karl H.; Riedl, Volker; and Arbesmeier, Bernhard, 4,926,539, Cl. 29-568.000.

Arbige, Michael V.; and Silver, Scott C., to Genencor, Inc. Preferential entrainment of enzymes in cheese curds. 4,927,644, Cl. 426-35.000.

Archer, Edward D.: *See—*
Schweizer, Werner; McGuire, Daniel J.; and Archer, Edward D., 4,927,322, Cl. 414-794.700.

Archery Designs, Inc.: *See—*
Peck, Paul L., 4,926,835, Cl. 124-35.200.

Argandona, Toby. Transition conduit system for fuel pump. 4,926,899, Cl. 137-364.000.

Argazzi, Dennis J.: *See—*
Gelinas, William A.; Holtz, Edwin R.; Argazzi, Dennis J.; Smigel, Robert L.; and Wiley, Dan W., 4,927,487, Cl. 156-351.000.

Arico, Joseph. Exhibit display. 4,926,609, Cl. 52-582.000.

Arima, Itsuo: *See—*
Ochiai, Kumi; Horie, Hiromichi; Arima, Itsuo; and Morita, Mikio, 4,927,473, Cl. 148-306.000.

Arima, Noburu; Ogino, Nobuyosi; and Kimura, Hirosi, to Shin-Etsu Handotai Co., Ltd.; and Sin-Etsu Quartz Products Co., Ltd. Method of forming thin film and apparatus therefor. 4,926,793, Cl. 118-730.000.

Arita, Eriya: *See—*
Morizumi, Mitsuo; Omura, Kinya; Arita, Eriya; Furuya, Katsuji; Yasuda, Sakae; and Kodera, Masaya, 4,926,914, Cl. 141-59.000.

Ariyoshi, Takashi: *See—*
Kaneuchi, Kunihiro; Yasuda, Seigou; Ariyoshi, Takashi; Nakatani, Tomofumi; and Aizawa, Hiroshi, 4,928,302, Cl. 379-88.000.

Armstrong, Bruce A.; and Dunn, Robert G., to Hermes Electronics Limited. Hydrophones and similar devices. 4,928,263, Cl. 367-118.000.

Armstrong, Robert E. Holding vessel with supportive handle. 4,927,046, Cl. 220-90.000.

Armstrong, Ronald W.: *See—*
Beard, Warren T., Jr.; and Armstrong, Ronald W., 4,928,294, Cl. 378-74.000.

Armstrong, William P.: *See—*
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.

Arndt, Heinrich: *See—*
Hirt, Manfred; and Arndt, Heinrich, 4,926,715, Cl. 475-337.000.

Arnn, Edward L.: *See—*
Jensen, Preben B.; and Arnn, Edward L., 4,928,315, Cl. 455-307.000.

Arretz, Emmanuel F. E., to Societe Nationale Elf Aquitaine (Production). Catalytic process for the production of mercaptans from thioethers. 4,927,972, Cl. 568-70.000.

ARSOC S.P.R.L.: *See—*
Maes, Felix V.; and Baikrich, Michel, 4,926,576, Cl. 42-101.000.

Arthur D. Little, Inc.: *See—*
McCullough, John E., 4,927,340, Cl. 418-55.000.

Arthur, Stephen D.; and Temple, Victor A. K., to General Electric Company. Method of making high breakdown voltage semiconductor device. 4,927,772, Cl. 437-6.000.

Artzberger, Thomas G., to M-B-W Inc. Vibratory mechanism for a compaction roller. 4,927,289, Cl. 404-117.000.

Asada, Tohru, to Aisin Seiki Kabushiki Kaisha. Door opening/closing device. 4,927,204, Cl. 292-216.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Shiraki, Toshinori; Hayano, Fusakazu; and Morita, Hideo, 4,927,889, Cl. 525-285.000.

Asai, Naohito. Ink container with dual-member sealing closure. 4,928,126, Cl. 346-140.00R.

Asakura, Hideo: *See—*
Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, 4,927,278, Cl. 400-208.000.

Asboth, Oscar. Air propeller. 4,927,330, Cl. 416-223.00R.

Asea Brown Boveri Aktiengesellschaft: *See—*
Steinleitner, Gunther; and Roze, Philipp, 4,927,475, Cl. 156-89.000.

Asensio, Javier; and Hayman, Richard, to Dow Chemical Company, The. Assembly of several layers having one or more reinforcing layers and fiber reinforced plastic article produced therefrom. 4,927,684, Cl. 428-91.000.

Ashihara, Ryohei; Suehiro, Kikumitsu; Sugino, Kazuo; and Miyoshi, Jun, to Matsushita Electric Industrial Co., Ltd. Dry cell. 4,927,719, Cl. 429-54.000.

Ashjaee, Javad; Helkey, Roger J.; Lorenz, Robert G.; and Sutherland, Robert A., to Ashtech Telesis, Inc. Global positioning system receiver with improved radio frequency and digital processing. 4,928,106, Cl. 342-352.000.

Ashland Oil, Inc.: *See—*
Tufts, Timothy A., 4,927,862, Cl. 521-118.000.
Ward, Clifford; Chao, Eugene; Booth, Roy E.; Turrill, Frank H.; Wombles, Robert H.; Newman, John W.; and Hettinger, William P., Jr., 4,927,620, Cl. 423-447.200.

Ashtech Telesis, Inc.: *See—*
Ashjaee, Javad; Helkey, Roger J.; Lorenz, Robert G.; and Sutherland, Robert A., 4,928,106, Cl. 342-352.000.

Aslam, Mohammad: *See—*
Vicari, Richard; Aslam, Mohammad; Ray, Wilson B.; Davenport, Kenneth G.; Dammel, Ralph; Lingnau, Juergen; and Doessel, Karl-Friedrich, 4,927,956, Cl. 560-130.000.

Assi, Francesco; Lancini, Giancarlo; and Gianantonio, Anacleto, to Gruppo Lepetit S.p.A. Method for selectively increasing the ratio of single major components of teicoplanin A2 complex. 4,927,754, Cl. 435-71.000.

Associated Universities, Inc.: *See—*
Sugama, Toshifumi, 4,927,462, Cl. 106-99.000.

AT&T Bell Laboratories: *See—*
Bensel, William H., III; Gladden, Robert H., Jr.; Malluck, John F.; Ross, Robert R.; and Williamson, Andrew H., Jr., 4,927,227, Cl. 350-96.200.
Pimpinella, Richard J.; and Segelken, John M., 4,926,545, Cl. 29-832.000.
Poelzing, Gerhard W., 4,927,590, Cl. 264-272.170.

Ataka, Hiroshi; and Furukawa, Yoshimi, to Honda Giken Kogyo Kabushiki Kaisha. Front and rear wheel steering vehicle with a minimized maneuvering area. 4,926,954, Cl. 180-140.000.

Atkins, Frank W.: *See—*
Fagerquist, Randy L.; Wood, Wendell L.; and Atkins, Frank W., 4,928,114, Cl. 346-75.000.
Fagerquist, Randy L.; Wood, Wendall L.; Atkins, Frank W.; and Bahl, Surinder K., 4,928,115, Cl. 346-75.000.

Atkinson, Tony: *See—*
Carr, Robert; Clarke, David J.; and Atkinson, Tony, 4,927,268, Cl. 356-336.000.

Atlantic Richfield Company: *See—*
Cowley, Trent E., 4,926,815, Cl. 123-198.0DB.

Atlas Fahrzeugtechnik GmbH: *See—*
Brandner, Burkhard; and Wenzlik, Klaus, 4,927,084, Cl. 239-584.000.

Atochem: *See—*
Bourjot, Pierre; and Garnaud, Marie-Anne, 4,927,184, Cl. 285-21.000.
Hilaire, Jean C.; and Guerin, Roland, 4,927,860, Cl. 521-60.000.
Lottiau, Michel; Glemet, Michel; Cognet, Gilles; and Caussier, Alain, 4,927,583, Cl. 264-136.000.

Atochem North America, Inc.: *See*—
Carson, Christlyn M.; Copping, Leonard G.; Ehr, Robert J.; Gitlitz, Melvin H.; McNeil, Maynard W.; Street, Peter F. S.; and Liebeschuetz, John W., 4,927,812, Cl. 514-63.000.
Martyak, Nicholas M., 4,927,506, Cl. 204-51.000.

Atsuumi, Shugo: *See*—
Tanaka, Seiichi; Koike, Yutaka; Nakano, Masato; Atsuumi, Shugo; Morishima, Hajime; and Matsuyama, Kenji, 4,927,565, Cl. 260-404.500.

Audi AG, Firma: *See*—
Heinemann, Joachim; Spies, Karl-Heinz; Keller, Frank; Beicht, Bernd; Leitermann, Wulf; and Lechler, Rolf, 4,926,921, Cl. 160-115.000.
Muller, Karl H.; Riedl, Volker; and Arbesmeier, Bernhard, 4,926,539, Cl. 29-568.000.
Putz, Heinrich; Nowitzki, Friedhelm; Damm, Gunter; Bathelt, Hartmut; Kromer, Gunter; Hoffmann, Henning; and Pischke, Reiner, 4,926,634, Cl. 60-274.000.

Auerbach, Abraham; and Friedman, Sonia, to BOC Group, Inc., The. Gas constituent measurement and recording. 4,927,766, Cl. 436-44.000.

Auger, Jean Marc: *See*—
Theeten, Jean-Bernard; Autier, Philippe; and Auger, Jean Marc, 4,927,785, Cl. 437-225.000.

Autier, Philippe: *See*—
Theeten, Jean-Bernard; Autier, Philippe; and Auger, Jean Marc, 4,927,785, Cl. 437-225.000.

Autoflug GmbH: *See*—
Pfabe, Peter; and Nohren, Hubert, 4,928,130, Cl. 342-9.000.

Auwarter, Gerhard; Imhof, Ernst; Komaroff, Iwan; Reum, Helmut; Schmid, Gunther; and Kaczynski, Bernhard, to Robert Bosch GmbH. System for injecting fuel into combustion chambers of an internal combustion engine. 4,926,819, Cl. 123-297.000.

Avantek, Inc.: *See*—
Khandavalli, Chandra, 4,928,078, Cl. 333-109.000.

Avidan, Amos A., to Mobil Oil Corporation. Circulating fluid bed combustion with circulating co combustion promoter. 4,926,766, Cl. 110-342.000.

Avidan, Amos A., to Mobil Oil Corporation. Circulating fluid bed combustion with CO combustion promoter and reduced combustion air. 4,927,348, Cl. 431-7.000.

AVL AG: *See*—
Fischer, Fritz; Kleinhappl, Erich; and Marsoner, Hermann, 4,927,603, Cl. 422-67.000.

Avny, Eli, to Sundstrand Corporation. System and method for obtaining a given preload on a spring. 4,926,687, Cl. 73-161.000.

Ayers, Alan D.: *See*—
Chancy, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., 4,927,720, Cl. 429-54.000.

Aztec Sensible Cooling, Inc.: *See*—
Hickey, Pieter John A.; and Claassen, Cornelius J., 4,926,656, Cl. 62-310.000.

Azuma, Yuichi: *See*—
Shibata, Katsuhiro; Azuma, Yuichi; Inoue, Masao; and Okumura, Shinichiro, 4,926,978, Cl. 188-73.100.

Azzalin, Italo, to C.G.V. S.p.A. Combination locks for suitcases, bags and the like. 4,926,663, Cl. 70-74.000.

B. F. Goodrich Company, The: *See*—
Backderf, Richard H.; and Donat, Frank J., 4,927,886, Cl. 525-261.000.
Kramer, James H., 4,927,007, Cl. 198-823.000.

B. & R. Choiniere Limited: *See*—
Laquerre, Yves, 4,926,625, Cl. 56-376.000.

Baba, Nobuo: *See*—
Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, 4,926,906, Cl. 137-625.300.

Baba, Sueki: *See*—
Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Yamamoto, Osamu; and Watanabe, Hiroshi, 4,928,297, Cl. 378-146.000.

Bablon, Guy P.; and Desbos, Gilbert, to Omnium de Traitements et de Valorisation (OTV). Method and installation for treating liquid by sedimentation using fine sand. 4,927,543, Cl. 210-711.000.

Bach, William D.; and Murphy, Donald R. Protector for joined extension cords. 4,927,377, Cl. 439-367.000.

Backderf, Richard H.; and Donat, Frank J., to B. F. Goodrich Company, The. Low inherent viscosity-high glass transition temperature enhancing agents produced by mass reaction polymerization as an overpolymer on polyvinyl chloride resins. 4,927,886, Cl. 525-261.000.

Backman, Sune. Method of filtering the effluent from a wire EDM process. 4,927,547, Cl. 210-771.000.

Bagheri, Mansour A. H.: *See*—
Fitzgerald, Walter P.; Sanders, Beatrix Y.; and Bagheri, Mansour A. H., 4,927,307, Cl. 411-302.000.

Baglee, David A.; and Parker, Ronald N., to Texas Instruments Incorporated. Method of reconditioning an electronically programmable memory device. 4,928,267, Cl. 365-218.000.

Bahl, Surinder K.: *See*—
Fagerquist, Randy L.; Wood, Wendall L.; Atkins, Frank W.; and Bahl, Surinder K., 4,928,115, Cl. 346-75.000.

Bahr, Christian; Heppke, Gerd; Lotzsch, Detlef; Dubal, Hans-Rolf; Escher, Claus; and Ohlendorf, Dieter, to Hoechst Aktiengesellschaft. Use of compounds or mixtures of compounds which have a chiral, orthogonal, more highly ordered smectic phase in the range of said phase as switching or indicating medium. 4,927,244, Cl. 350-350.00S.

Bahroos, Gobind; and Joste, Patrick B., to Masco Corporation of Indiana. Valve for a hand held spray nozzle. 4,927,115, Cl. 251-241.000.

Baikrich, Michel: *See*—
Maes, Felix V.; and Baikrich, Michel, 4,926 476, Cl. 42-101.000.

Bailey, David B.; Harrison, Daniel J.; and Yacobucci, Paul D., to Eastman Kodak Company. Thermal dye transfer receiving layer of polycarbonate with nonaromatic diol. 4,927,803, Cl. 503-227.000.

Bailey, Gardner S.: *See*—
Cordes, Harry D.; Duich, Michael B.; and Bailey, Gardner S., 4,927,434, Cl. 55-20.000.

Bailey, Jennifer A., to R. J. Reynolds Tobacco Company. Anti-stick package for hygroscopic foods. 4,927,647, Cl. 426-126.000.

Bailey, Louis, to Bailey, Louis. Gear selector for bicycle hub transmission. 4,925,714, Cl. 74-337.500.

Bailey, Lowell; and Libbert, Hervey, to Lane & Roderick, Inc. Forming process for producing sharp corners in sheet metal. 4,926,676, Cl. 72-389.000.

Bailey, Samuel, to Beta Development Group, Inc. Heat transfer pad. 4,927,997, Cl. 219-459.000.

Baker, David J.; Dubuque, Kenneth J.; Estep, John M.; and Hix, Charles J., Jr., to Ingersoll-Rand Company. Tilt valve cartridge. 4,927,114, Cl. 251-240.000.

Baker Hughes Incorporated: *See*—
Baugh, J. Lindley, 4,926,939, Cl. 166-208.000.

Baker Mervyn R.; Pearson, Raymond J.; and Emsley, Roger. Folding ladders. 4,926,967, Cl. 182-164.000.

Baker, Raymond; Carling, William R.; James, Kim; and Leeson, Paul D., to Merck Sharp & Dohme Limited. Cyclo-octane neuroprotective agents. 4,927,819, Cl. 514-213.000.

Baldacci, Massimo: *See*—
Caccia, Giulio; and Baldacci, Massimo, 4,927,849, Cl. 514-455.000.

Baldi, Alfonso L., to Alloy Surfaces Company, Inc. Diffusion-coated metals. 4,927,798, Cl. 502-301.000.

Baldwin, Lillian P.: *See*—
Williams, Joel L.; Montgomery, David B.; and Baldwin, Lillian P., 4,927,676, Cl. 428-36.000.

Ballweber, Dieter: *See*—
Weber, Heinz; Nintz, Eckhard; Walter, Manfred; Ballweber, Dieter; and Ostermayer, Bertram, 4,927,859, Cl. 521-59.000.

Bamford, William: *See*—
Miskin, Michael; Bamford, William; and Lake, Micheal D., 4,926,553, Cl. 30-49.000.

Banbury, John R.; and Barter, Derek L., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Optical system for head-up displays. 4,927,234, Cl. 350-174.000.

Bando, Niro: *See*—
Murakawa, Masatake; Bando, Niro; Tone, Masatsugu; Yuki, Mikio; Miyata, Junji; Hayashi, Tetsuaki; and Kurohara, Kazuaki, 4,926,624, Cl. 56-202.000.

Banks, Bernard J.; and Witty, Michael J., to Pfizer Inc. Antiparasitic agents. 4,927,918, Cl. 536-7.100.

Banyu Pharmaceutical Co., Ltd.: *See*—
Tanaka, Seiichi; Koike, Yutaka; Nakano, Masato; Atsuumi, Shugo; Morishima, Hajime; and Matsuyama, Kenji, 4,927,565, Cl. 260-404.500.

Bara, Edward J.: *See*—
Bykadi, Gururaj; Kaplan, Murray A.; Corrao, Richard G.; Bara, Edward J.; Ullah, Ismat; and Aghajkar, Shreeram N., 4,927,638, Cl. 424-455.000.

Barbara, Bruce: *See*—
Abbott, Robert A.; Barbara, Bruce; and Roy, Richard S., 4,928,266, Cl. 365-189.010.

Barkell, J. Warren, Jr.: *See*—
Morris, Arnold M.; D'Zurko, Daphne; Pilsbury, Richard H.; Barkell, J. Warren, Jr.; Orndorff, Karl B.; and Lawson Randall S., 4,926,974, Cl. 187-52.0LC.

Barker, Nicholas E.: *See*—
Lilly, Carol E. H.; Moore, Loyd C.; Eike, Mark E.; and Barker, Nicholas E., 4,926,758, Cl. 108-43.000.

Barkley, Paul E.: *See*—
Fauth, Frederick E., Sr.; and Barkley, Paul E., 4,926,999, Cl. 198-358.000.

Barlou, Andre ; Beltritti, Alexandre; Gramondi, Patrick; and Vidal, Hugues, to Commissariat a l'Energie Atomique. Method for conditioning radioactive or toxic wastes in thermosetting resins. 4,927,564, Cl. 252-628.000.

Barnabe, Jean-Pierre: *See*—
Hobnigie, Audio; Barnabe, Jean-Pierre; and Mouhot, Frederic, 4,927,286, Cl. 403-322.000.

Barnett, John A.: *See*—
Pitt, Gilles D.; Jones, Roger E.; Antell, George R.; Spicer, Lyndon R.; Barnett, John A.; and Hill, Robert, 4,928,319, Cl. 455-612.000.

Barnett, Ronald E.; Dikeman, Roxane; Liao, Shyh-Yuan; Gill, John; and Pantaleone, David P., to Nutrasweet Company, The. Water soluble bulking agents. 4,927,654, Cl. 426-548.000.

Barrier, Ronald B.: *See*—
Phipps, Jackie M.; and Barrier, Ronald B., 4,926,532, Cl. 29-25.350.

Barrow, Lascelle A.: *See*—
Small, Richard F.; Patel, Dakshesh S.; Barrow, Lascelle A.; and Dix, Barry M., 4,927,663, Cl. 427-40.000.

Barson Corporation: *See*—
Priceman, Seymour, 4,927,714, Cl. 428-628.000.

Barss, Steven H.: *See*—
Spehrley, Charles W., Jr.; Barss, Steven H.; Tomaszewski, David G.; and Hoisington, Paul A., 4,928,120, Cl. 346-140.00R.

Barter, Derek L.: *See*—
Banbury, John R.; and Barter, Derek L., 4,927,234, Cl. 350-174.000.

Barthelemy, Alain; Maneuf, Serge; and Froehly, Claude, to Centre National De La Recherche Scientifique. Laser generator with phase mode-locking. 4,928,282, Cl. 372-18.000.

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Fuchs, Hugo; and Agar, David, 4,927,542, Cl. 210-711.000.
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Weber, Heinz; Nintz, Eckhard; Walter, Manfred; Ballweber, Dieter; and Ostermayer, Bertram, 4,927,859, Cl. 521-59.000.

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Hays, Byron G., 4,927,466, Cl. 106-494.000.

Bass, Joyce H. Bidet. 4,926,509, Cl. 4-448.000.

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Gabbe, David; and Batchelder, Ned, 4,928,252, Cl. 364-519.000.

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Beck, Martin H., to Devtech, Inc. Preform for a monobase container. 4,927,679, Cl. 428-36.920.

Becker, Wolfgang, to Ruhrkohle AG. Oven door. 4,927,501, Cl. 202-248.000.

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Glen, Stefan J.; and Ellison, William E., 4,927,406, Cl. 494-84.000.
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Lynn, William R.; and Belanger, Roger R., 4,926,515, Cl. 15-4.000.

Belangie, Michael C. Joint seal for concrete highways. 4,927,291, Cl. 404-64.000.

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Bell, Allyn Roy: *See*—
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Koslowski, Gerhard; and Bollen, Manfred, 4,926,531, Cl. 28-173.000.

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Diehl, Roy E.; and Berger, Alvin H., 4,926,810, Cl. 123-192.00B.

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Bernstein, Joel E. Method and composition for treating pediculosis capitis. 4,927,813, Cl. 514-65.000.

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Sargent, Charles L.; Antos, John M.; and Biba, Scott I., 4,926,508, Cl. 4-329.000.

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Kloetzer, Erhard; Kioustelidis, Johannes; and Schmidt, Guenter, 4,927,463, Cl. 106-109.000.

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Biswas, Gautam; Black, David C.; Duncan, Michael G.; Key, Gary R.; Leak, Gordon D.; and Whittington, Robert D., to International Business Machines Corporation. Dynamically configurable telephone. 4,928,306, Cl. 379-201.000.

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Blackburn, Martin J.; and Smith, Michael P., to United Technologies Corporation. Method for improving the toughness of brittle materials fabricated by powder metallurgy techniques. 4,927,458, Cl. 75-246.000.

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Schimmel, Karl F.; and Blackburn, William P., 4,927,868, Cl. 523-439.000.

Blancke, Bernard, to Aerospatiale Societe Nationale Industrielle. Method for tilting the moment of inertia of a rotating free body in space into any given direction. 4,927,101, Cl. 244-164.000.

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Blazic, Leonard J.; and Janosko, Robert J., to Chrysler Corporation. Cup holder. 4,927,108, Cl. 248-311.200.

Bleckmann, Gerhard: *See*—
Wallbillich, Guenter; Bleckmann, Gerhard; and Scholz, Dankmar, 4,927,740, Cl. 430-309.000.

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Bluege, John, to United Technologies Corporation. Glass/fiber composite and a method of its manufacture. 4,927,790, Cl. 501-32.000.

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Board of Regents, The University of Texas: *See*—
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BOC Group, Inc., The: *See*—
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Fitzpatrick, Nicholas B., 4,926,681, Cl. 73-52.000.

Bock, Josef. Process and plant for pressing flexible sheets. 4,927,479, Cl. 156-228.000.

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Bohen, Joseph M., to Pennwalt Corporation. Halophenyl ester flame retardants for polyphenylene ether resins. 4,927,873, Cl. 524-288.000.

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Bollen, Manfred: *See*—
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Bonde, Kevin G., to Tecumseh Products Company. Inverted port engine with cross-under intake passage. 4,926,813, Cl. 123-195.0HC.

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Bonetti, Carla: *See*—
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Bonnard, John A. Method of and apparatus for determining melting points. 4,927,270, Cl. 374-16.000.

Bookwalter, John R. Biopsy needle with completely closable cutting end bore. 4,926,877, Cl. 128-754.000.

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Boudakian, Max M.; and Fidler, Delmer A., to Olin Corporation. Process for low chloride 1,2,4-triazol-5-one. 4,927,940, Cl. 548-263.200.

Boudreau, Alban M. Folding saw-horse. 4,926,966, Cl. 182-155.000.

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Boveri, Sergio: *See—*
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Bowers, Wayne E., to Fuel Tech, Inc. Reduction of nitrogen- and carbon-based pollutants. 4,927,612, Cl. 423-235.000.

Bowler, Peter T.; and Zeeff, Thomas J., to Feco Engineered Systems, Inc. Rotational container holding device and method. 4,927,205, Cl. 294-94.000.

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Bowman, Robert G.: *See—*
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Brace, Regie P. Axe maul apparatus. 4,926,558, Cl. 30-308.100.

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Braddick, Britt O., to Texas Iron Works, Inc. Multiple purpose liner hanger construction. 4,926,936, Cl. 166-217.000.

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Hallings, Leonard L.; Bramer, Donald W.; Sanborn, Bruce A.; and Schryver, James E., 4,928,211, Cl. 362-33.000.

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Sosto, Sadario O.; and De Moura, Wilson G., 4,927,861, Cl. 521-99.000.

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Trundle, Clive; and Brettle, Jack, 4,927,180, Cl. 283-70.000.

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Abe, Norio; and Fukaura, Osamu, 4,927,488, Cl. 156-460.000.
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Tate, David P.; and Graves, Daniel F., 4,927,887, Cl. 525-279.000.

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Bykadi, Gururaj; Kaplan, Murray A.; Corrao, Richard G.; Bara, Edward J.; Ullah, Ismat; and Agharkar, Shreeram N., 4,927,638, Cl. 424-455.000.
Douglas, James L.; Fabre, Guy; and Demosthene, Claude, 4,927,970, Cl. 564-462.000.
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Sit, Sing-Yuen; and Wright, John J., 4,927,944, Cl. 549-292.000.
Vyas, Dolatrai M.; Doyle, Terrence W.; and Partyka, Richard A., 4,927,943, Cl. 548-422.000.

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British Telecommunications plc: *See—*
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Katzenstein, Henry S., 4,928,102, Cl. 341-154.000.

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Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, 4,927,278, Cl. 400-208.000.
Niikawa, Takeshi, 4,927,277, Cl. 400-56.000.

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Gifford, Hanson S., III; Simpson, John B.; and Brown, Peter S., 4,926,858, Cl. 606-159.000.

Brown, Roger C.; Dixon, John; and Robinson, David H., to Fisons plc. 1,3,4-thiadiazoles. 4,927,822, Cl. 514-236.200.

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Brownlee, Robert G., to 501 Microphoretic Systems, Inc. Detector for fluorescence and absorption spectroscopy. 4,927,265, Cl. 356-73.000.

Bruce, John M., to Victoria University of Manchester, The. Compounds of the anthraquinone series. 4,927,845, Cl. 514-440.000.

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Brueck, Erhard, to Wilhelm Loh Wetzlar Optikmaschinen GmbH & Co. KG. Device for centering of optic lenses in a mechanical mounting, in particular during edge cutting and bevelling. 4,926,588, Cl. 51-217.00T.

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Keens, Axel; and Simon, Arno, 4,927,269, Cl. 356-346.000.

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Bruntz, Rodney D., to Carlson Company, Inc., The. Enclosed dry clutch/brake. 4,926,989, Cl. 192-18.00A.

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Bryson, Robert E., to Kimberly-Clark Corporation. Method and apparatus for creating a graduated distribution of granule materials in a fiber mat. 4,927,582, Cl. 264-113.000.

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Kropielnicki, Jerzy J.; Easter, Brian; and Last, James D., 4,928,108, Cl. 343-704.000.

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Budinger, William D. Method and apparatus for determination and display of critical gas supply information. 4,926,703, Cl. 73-865.100.

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Buendia, Jean: *See*—
Vivat, Michel; and Buendia, Jean, 4,927,921, Cl. 540-110.000.

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Merrem, Hans-Joachim; Buhr, Gerhard; and Lenz, Ruediger, 4,927,732, Cl. 430-191.000.

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Zulian, Ferruccio, 4,928,224, Cl. 364-200.000.

Bulley, John L., to JLB Textiles Limited. Tubular bandage and a method for its application. 4,926,851, Cl. 128-157.000.

Bulso, Joseph D., Jr.; and Lewers, William R., to Redicon Corporation. Method and apparatus for multidirectional sheet feeding. 4,926,724, Cl. 83-35.000.

Bunch, Richard P., to Converse Inc. Shoe with cradle arch support. 4,926,569, Cl. 36-91.000.

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Buntrock, Kermit A.; English, Daniel R.; and Jones, Wescomb R., 4,927,673, Cl. 427-376.200.

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Burgdore, Jochen, to Alfred Teves GmbH. Slip-controlled hydraulic brake system. 4,927,213, Cl. 303-116.000.

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Burke, Gary R.: *See*—
Dao, Tich T.; and Burke, Gary R., 4,928,223, Cl. 364-200.000.

Burkit, John W. Internal expansion coupling device. 4,927,189, Cl. 285-109.000.

Burley, John S., to Burley's Ring Supply. Dasher board system. 4,927,134, Cl. 272-3.000.

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Burley, John S., 4,927,134, Cl. 272-3.000.

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Butler, James W.; Korniski, Thomas J.; and Colvin, Alex D., to Ford Motor Company. Measuring multicomponent constituency of gas emission flow. 4,928,015, Cl. 250-343.000.

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Byron, David E., to Red Eye Arms, Inc. Polymer gun operating handle. 4,926,739, Cl. 89-1.400.

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C & C Incorporated: *See*—
Wagner, Joseph M., 4,927,202, Cl. 296-107.000.

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C. H. Perrott, Inc.: *See*—
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Calley, Fred L., to Navistar International Transportation Corp. Cylinder head intake manifold interface. 4,926,812, Cl. 123-193.00H.

Calderon, Albert. Method for producing and treating coal gases. 4,927,430, Cl. 48-197.00R.

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Cambio, Orlando D., Jr.; and Refsland, Earl R., to Hudson Oxygen Therapy Sales Company. Feeding system. 4,926,856, Cl. 128-203.260.

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Campau, Daniel N., to Flow-Rite Controls, Ltd. Apparatus for aerating water in a container. 4,927,568, Cl. 261-36.100.

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Wood, Gordon H., 4,927,396, Cl. 441-33.000.

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Meunier, Pierre P., 4,926,853, Cl. 128-201.180.
Canadian Patents & Development Ltd.: *See—*
Loschiavo, Samuel R., 4,927,635, Cl. 424-409.000.
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Kinoshita, Takao, 4,928,137, Cl. 358-213.260.
Murata, Jun, 4,927,280, Cl. 400-661.000.
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Taniguchi, Osamu; Onitsuka, Yoshihiro; and Mihara, Tadashi, 4,927,243, Cl. 350-350.00S.
Tokumitsu, Jun, 4,927,230, Cl. 350-96.240.
Torisawa, Akira; Kakizaki, Masaaki; Ito, Noriaki; and Yoshimura, Shigeru, 4,928,050, Cl. 318-696.000.
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Yoshizawa, Tetsuo; Terayama, Yoshimi; Kondo, Hiroshi; Sakaki, Takashi; Haga, Shunichi; Ichida, Yasuteru; and Konishi, Masaki, 4,926,549, Cl. 29-876.000.
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Cantatore, Giuseppe; and Borzatta, Valerio, to Ciba-Geigy Corporation. Piperidine compounds and their use as thermal stabilizers. 4,927,925, Cl. 540-598.000.
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Cantrell, Gary L., to Mallinckrodt Inc. Catalytic method for producing fluoroaromatic compounds using branched alkyl pyridinium salts. 4,927,980, Cl. 568-937.000.
Capelle, Gerd, to Hermann Berstorff Maschinenbau GmbH. Method and apparatus for producing tread strips for automotive vehicle tires. 4,927,482, Cl. 156-243.000.
Carbone Industrie: *See—*
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Heinemann, Joachim; Spies, Karl-Heinz; Keller, Frank; Beicht, Bernd; Leitermann, Wulf; and Lechler, Rolf, 4,926,921, Cl. 160-115.000.
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Culling, John H., 4,927,602, Cl. 420-586.000.
Carr, Jeff A., to Carr Pattern Co., Inc. Light mount assembly having raised and lowered positions. 4,928,216, Cl. 362-66.000.
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Carr, Robert; Clarke, David J.; and Atkinson, Tony, to Public Health Laboratory Service Board. Optical analysis. 4,927,268, Cl. 356-336.000.
Carr, Walter J., Jr.: *See—*
Iyer, Natraj C.; Carr, Walter J., Jr.; and Male, Alan T., 4,927,985, Cl. 174-125.100.
Carrico, John P., Jr.: *See—*
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Carrodus, Melvin A.: *See—*
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Carruth, Walter L.; Jones, Warren P.; and Stacy, Richard B., to SSI Medical Services, Inc. Weigh bed. 4,926,951, Cl. 177-144.000.
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Carson, Chrislyn M.; Copping, Leonard G.; Ehr, Robert J.; Gitlitz, Melvin H.; McNeil, Maynard W.; Street, Peter F. S.; and Liebeschuetz, John W., to Atochem North America, Inc.; and Dow Chemical Company, The. Morpholinyl silanes and use for control of plant diseases caused by fungi. 4,927,812, Cl. 514-63.000.
Carter, David H.: *See—*
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Carver, David C.: *See—*
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Cell Enterprises, Inc.: *See—*
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Zimmermann, Bernd D.; Claus, Richard O.; and Murphy, Kent A., 4,928,004, Cl. 250-227.140.
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Central Sprinkler Corporation: *See—*
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Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., to Eveready Battery Company, Inc. Electrochemical cell having a safety vent closure. 4,927,720, Cl. 429-54.000.
Chang, Steve C. S.; and Miller, Thomas E., to Ciba Corning Diagnostics Corp. Method for enhancement of chemiluminescence. 4,927,769, Cl. 436-518.000.
Chanock, Robert M.; Kapikian, Albert; Midthun, Karen; Flores, Jorge; Gorziglia, Mario; Hoshino, Yasutaka; and Peres-Schael, Irene, to United States of America, Health and Human Services. Vaccine against rotavirus diseases and method of preparing same. 4,927,628, Cl. 424-89.000.
Chao, Eugene: *See—*
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Cheng, David; Hartlage, Robert P.; and Zhang, Wesley W., to Applied Materials, Inc. Laser interferometer system for monitoring and controlling IC processing. 4,927,485, Cl. 156-345.000.
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Cherry Semiconductor Corporation: *See—*
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Cheskis Harvey P.: *See*—
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Chevron, Inc.: *See*—
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Chevron Research Company: *See*—
Erdman, Timothy R.; Shippey, Michael A.; and Wollenberg, Robert H., 4,927,551, Cl. 252-42.700.
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Chiyoshi, Toyoharu: *See*—
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Chovin, Andre ; and Taillebois, Jacques, to Crouzet. Digital timer with constant resolution. 4,928,270, Cl. 368-82.000.

Chr. Hansen's Laboratory, Inc.: *See*—
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Chrysler Corporation: *See*—
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Mehta, Hemang S.; Holbrook, Gerald L.; and Leising, Maurice B., 4,928,235, Cl. 364-424.100.

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Chu, Raymond W. H.: *See*—
Wang, Patrick S.; Strobl, Georg; and Chu, Raymond W. H., 4,927,379, Cl. 439-398.000.

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Chung, Huy. Method and apparatus for germinating seed sprouts. 4,926,598, Cl. 47-61.000.

Chung, Landy. Boiler furnace air register. 4,927,352, Cl. 431-184.000.

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Cantatore, Giuseppe; Borzatta, Valerio; and Masina, Franca, 4,927,930, Cl. 544-198.000.
Duthaler, Rudolf; Finter, Jurgen; Fischer, Walter; and Ramanathan, Visvanathan, 4,927,865, Cl. 522-48.000.
Fory, Werner; and Meyer, Willy, 4,927,450, Cl. 71-91.000.
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Schneider, Peter; Ramos, Gerardo; and Bersier, Jacques, 4,927,507, Cl. 204-78.000.
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Ciloglu, Cavit; Gagne, Martin; Laraque, Edy; Poirier, Joel; Tremblay, Sylvain; and Trudel, Yves, to Quebec Metal Powders, Ltd. Machinable-grade, ferrous powder blend containing boron nitride and method thereof. 4,927,461, Cl. 75-254.000.

Cioletti, Oliise C., to United States of America, Energy. Pull rod assembly. 4,926,745, Cl. 92-256.000.

Ciotola, Alfredo A. Apparatus and method for sealing leaks. 4,927,181, Cl. 285-15.000.

Circello, Joseph C.: *See*—
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Claassen, Cornelius J.: *See*—
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Clark, Aidan W.: *See*—
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Clark, John K.: *See*—
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Clarke, David J.: *See*—
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Claus, Richard O.: *See*—
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Clem Environmental Corporation: *See*—
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Clemence, Francois; Frechet, Daniel; and Fortin, Michel, to Roussel Uclaf. Novel tetrahydropyridines having analgesic activity. 4,927,832, Cl. 514-299.000.

Clifton, Raymond E., Jr. Apparatus for preventing truck roll over in the event of failure of its suspension system. 4,927,173, Cl. 280-755.000.

Clorox Company, The: *See*—
Antaki, James M.; and Layne, Daniel T., III, 4,927,657, Cl. 426-589.000.

CMB Packaging (UK) Limited: *See*—
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Coca-Cola Company, The: *See*—
Groover, Phillip B., 4,927,055, Cl. 221-67.000.
Rudick, Arthur G., 4,927,567, Cl. 261-35.000.

Coffman, Cynthia L. Sole protector attachment. 4,926,568, Cl. 36-15.000.

Cognet, Gilles: *See*—
Lottiau, Michel; Glemet, Michel; Cognet, Gilles; and Causier, Alain, 4,927,583, Cl. 264-136.000.

Cohen, Amir: *See*—
Greenberg, Ilan; and Cohen, Amir, 4,927,082, Cl. 239-230.000.

Cohen, Michael F.: *See*—
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Colarusso, Remo J., Jr., to Colgate-Palmolive Company. Process for making thixotropic detergent compositions. 4,927,555, Cl. 252-99.000.

Colbar Art, Inc.: *See*—
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Colea, Ovidiu, to Colbar Art, Inc. Colbar art. 4,927,686, Cl. 428-13.000.

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Colarusso, Remo J., Jr., 4,927,555, Cl. 252-99.000.
Nimmey, Alan; and Hayes, Harry, 4,927,058, Cl. 222-106.000.

Coll, Alain. Movable shower assembly having an automatically retracting hose and a shower head capable of taking up multiple positions. 4,926,511, Cl. 4-605.000.

Collette, Wayne N.; Krishnakumar, Suppayan M.; and Piccioli, David P., to Continental PET Technologies, Inc. Preform and method of forming container therefrom. 4,927,680, Cl. 428-36.920.

Colley, Alice M.: *See*—
Guggenheim, Thomas L.; McCormick, Sharon J.; and Colley, Alice M., 4,927,904, Cl. 528-182.000.

Collier, John C., to ITT Industries Limited. Electrical connector. 4,927,372, Cl. 439-83.000.

Collins, Ronald H.: *See*—
Eisenberg, Eugene; Lindsay, Frederick E.; Evans, James J.; and Collins, Ronald H., 4,926,801, Cl. 123-41.840.
Collins, William D.; and Sundown, Jeremiah. Variable chord-forming capotasto. 4,926,732, Cl. 84-318.000.
Colorado Biomedical, Inc.: *See*—
Newkirk, John B.; and Manwaring, Kim H., 4,927,420, Cl. 606-45.000.
Colote, Acaye S.: *See*—
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Colt Industries Inc.: *See*—
Sims, Dewey M., Jr.; and Mick, Ray E., 4,928,083, Cl. 338-202.000.
Columbian Chemicals Company: *See*—
Berg, Alan C.; and Jones, William R., Jr., 4,927,607, Cl. 422-150.000.
Colvin, Alex D.: *See*—
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Commissariat a l'Energie Atomique: *See*—
Barlou, Andre ; Beltritti, Alexandre; Gramondi, Patrick; and Vidal, Hugues, 4,927,564, Cl. 252-628.000.
Compagnie Des Products Industriels de l'Ouest (C.P.I.O.): *See*—
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Compagnie Oris Industries: *See*— .
Mathis, Gerard; and Lehn, Jean-Marie, 4,927,923, Cl. 540-456.000.
Compaq Computer Inc.: *See*—
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Constantine, Barry E.: *See*—
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Continental PET Technologies, Inc.: *See*—
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Contour Saws, Inc.: *See*—
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Bunch, Richard P., 4,926,569, Cl. 36-91.000.
Coogan, Richard G.; and Vartan-Boghossian, Razmik, to ICI Americas Inc. Aqueous dispersions. 4,927,876, Cl. 524-457.000.
Cook, Bruce M.: *See*—
Roslund, Charles J.; and Cook, Bruce M., 4,928,219, Cl. 363-54.000.
Cook, Graham R., to Goodman, Clifford Lawrence. Nail holding tool. 4,926,718, Cl. 81-44.000.
Coombs, Jeffrey: *See*—
Brooks, Reginald G.; Leatham, Alan; and Coombs, Jeffrey, 4,926,923, Cl. 164-5.000.
Brooks, Reginald G.; Leathman, Alan; and Coombs, Jeffrey, 4,926,924, Cl. 164-5.000.
Cooper Industries, Inc.: *See*—
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Carson, Chrislyn M.; Copping, Leonard G.; Ehr, Robert J.; Gitlitz, Melvin H.; McNeil, Maynard W.; Street, Peter F. S.; and Liebeschuetz, John W., 4,927,812, Cl. 514-63.000.
Corbett, Reg D. Vertically adjustable floating dock. 4,926,776, Cl. 114-263.000.
Cordes, Harry D.; Duich, Michael B.; and Bailey, Gardner S., to Pall Corporation. Gas component extraction. 4,927,434, Cl. 55-20.000.
Corley, Dean; and Littlebury, Hugh, to Motorola Inc. Method of recording test results of die on a wafer. 4,928,002, Cl. 235-479.000.
Corley, Larry S., to Shell Oil Company. Bisbenzocyclobutene/-bisimide/free radical polymerization inhibitor composition. 4,927,907, Cl. 528-322.000.
Cormier, William E., Jr.: *See*—
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Corominas, Juan P.; Constansa, Jordi F.; and Pinol, Augusto C., to Laboratorios del Dr. Esteve S.A. Derivatives of 7-(1-azetidinyl)-1,4-dihydro-4-oxo-3-quinolinecarboxylic acids, their preparation and application as medicines. 4,927,926, Cl. 544-101.000.
Corpron, Gary P.: *See*—
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Corrao, Richard G.: *See*—
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Corstor (Proprietary) Limited: *See*—
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Cortese, Richard: *See*—
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Costar Corporation: *See*—
Lyman, George; and Mathus, Gregory, 4,927,764, Cl. 435-296.000.
Mathus, Gregory; and Lyman, George, 4,927,604, Cl. 422-101.000.
Costello, Anthony W.; Ogg, Graeme J.; and McGregor, John C., to RMF Steel Products Co. Packaging method and apparatus. 4,926,614, Cl. 53-434.000.
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Coughlin, Peter K.; Mercer, William C.; and Flanigen, Edith M., to UOP. Grown crystalline sensor and method for sensing. 4,927,768, Cl. 436-172.000.
Coup, Michael C.; Israel, Gary P.; Ediger, Glen W.; and Moore, Donald J., to Vornado Air Circulation Systems, Inc. Ducted fan. 4,927,324, Cl. 415-121.200.
Couture, Jean. Paper-making wire repair kit. 4,926,533, Cl. 29-33.00F.
Cowie, Alan G., to Tioxide Group PLC. Particulate material. 4,927,464, Cl. 106-436.000.
Cowley, Trent E., to Atlantic Richfield Company. Rapid shut-off system for truck engine. 4,926,815, Cl. 123-198.0DB.
Coyle, Brian D. Folding paperboard beach chair. 4,926,512, Cl. 5-417.000.
Cozine, Mark L.; Ferguson, David G.; Hansen, Loren F.; and Lamb, Mark E. Turf aerating apparatus with resilient handle mount. 4,926,947, Cl. 172-22.000.
Crafts, Harold S., to NCR Corporation. Gate isolated base cell structure with off-grid gate polysilicon pattern. 4,928,160, Cl. 357-54.000.
Craig, Burnie M.; and Fujitaki, Roy K., to American Brass and Aluminum Foundry Co., Inc. Adjustable drain closure. 4,926,507, Cl. 4-295.000.
Cramer, Harley L., to Owens-Illinois Plastic Products Inc. Plastic drum and method of making. 4,927,040, Cl. 220-5.00R.
Crawley, H. Bert; Rosenberg, Eli I.; Meyer, W. Thomas; Gorbics, Mark S.; Thomas, William D.; McKay, Roy L.; and Homer, John F., Jr., to Iowa State University Research Foundation, Inc. Multiple channel data acquisition system. 4,928,246, Cl. 364-514.000.
Creative Packaging Corp.: *See*—
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Creazzo, Joseph A.: *See*—
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Crews, John H., Jr.; and Reeder, James R., to United States of America, National Aeronautics and Space Administration. Delamination test apparatus and method. 4,926,694, Cl. 73-794.000.
Cristescu, Alex G.: *See*—
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Cros, Alain, to NOVATOME. Device for cooling the main vessel of a fast neutron nuclear reactor cooled by a liquid metal. 4,927,597, Cl. 376-290.000.
Crossley, Roger; and Heatherington, Kenneth, to John Wyeth and Brother Ltd. Quinoline derivatives. 4,927,936, Cl. 546-181.000.
Crouch, Robert H. Edge sander having adjustable support table or tables. 4,926,602, Cl. 51-135.00R.
Crouzet: *See*—
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Crowley, Steven R.: *See*—
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Cubic Defense Systems, Inc.: *See*—
Bonebright, Mark E.; Eberhardt, Paul R.; and Alley, John C., 4,928,109, Cl. 343-786.000.
Culler, Robert P.: *See*—
Cetinkaya, Ismail B.; and Culler, Robert P., 4,927,606, Cl. 422-144.000.
Culling, John H., to Carondelet Foundry Company. Heat and corrosion resistant alloys. 4,927,602, Cl. 420-586.000.
Culp, Gordon W., to Rockwell International Corporation. Piezoelectric actuator. 4,928,030, Cl. 310-328.000.
Cumming, James C., to Rockwell International Corporation. Automatic brake adjusting mechanism. 4,926,980, Cl. 188-79.550.
Curran, William V.: *See*—
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Curt G. Joa, Inc.: *See*—
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Cusdin, George B., to W. R. Grace Limited. Relief printing plate manufacture. 4,927,723, Cl. 430-15.000.
Cutcher, John A.; and Andrews, Gary M., to Castrol Industrial Inc. Corrosion preventive composition. 4,927,550, Cl. 252-32.500.
Cyprus Mines Corporation: *See*—
Weber, Kenneth E., 4,927,874, Cl. 524-375.000.
Czarnecki, Stephen J.: *See*—
Blondeau, Ernest E., Jr.; and Czarnecki, Stephen J., 4,928,276, Cl. 370-110.100.
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Dahlmann, Gerd-Uwe, to Volkswagen AG. Fuel injection system. 4,926,824, Cl. 123-450.000.

Dai Nippon Insatsu Kabushiki Kaisha: *See*—
Kawasaki, Sadanobu; Yamauchi, Mineo; and Akada, Masanori, 4,927,666, Cl. 427-146.000.

Daido Tokushuko Kabushiki Kaisha: *See*—
Iikubo, Tomohito; and Kurebayashi, Yutaka, 4,927,601, Cl. 420-111.000.
Umeno, Masayoshi; Sakai, Shiro; and Yahagi, Shinichiro, 4,928,154, Cl. 357-16.000.

Daihatsu Motor Co., Ltd.: *See*—
Tsumura, Kenji; Yamada, Yukifumi; and Terada, Takami, 4,927,110, Cl. 248-430.000.

Daikin Industries, Ltd.: *See*—
Hisamoto, Iwao; Hirai, Masaru; and Ishikawa, Sueyoshi, 4,927,950, Cl. 556-419.000.

Daimler-Benz Aktiengesellschaft: *See*—
Tomforde, Johann; and Wall, Monika, 4,927,106, Cl. 248-146.000.

Dainippon Ink. and Chemicals, Inc.: *See*—
Rokutanda, Shuji; Higemitsu, Yasuo; Tsuchida, Akiyoshi; and Yamakoshi, Yukihiro, 4,927,734, Cl. 430-264.000.

Dake, Michael D.; and Maguire, Mark A., to Advanced Cardiovascular Systems, Inc. Catheter for uniform distribution of therapeutic fluids. 4,927,418, Cl. 604-264.000.

Dale Electronic, Inc.: *See*—
Bougger, Gary E., 4,926,542, Cl. 29-619.000.

Dalebroux, Dean G.: *See*—
Sudoma, A. Louis; and Dalebroux, Dean G., 4,927,763, Cl. 435-260.000.

Dallago, Raymond P.: *See*—
Johnson, Grannis S.; Grinstein, Reuben H.; Hartman, Stuart J.; and Dallago, Raymond P., 4,927,902, Cl. 528-99.000.

Daly, John J., to GRID Systems Corporation. Conductive stylus storage for a portable computer. 4,927,986, Cl. 178-18.000.

Damm, Gunter: *See*—
Putz, Heinrich; Nowitzki, Friedhelm; Damm, Gunter; Bathelt, Hartmut; Kromer, Gunter; Hoffmann, Henning; and Pischke, Reiner, 4,926,634, Cl. 60-274.000.

Dammel, Ralph: *See*—
Vicari, Richard; Aslam, Mohammad; Ray, Wilson B.; Davenport, Kenneth G.; Dammel, Ralph; Lingnau, Juergen; and Doessel, Karl-Friedrich, 4,927,956, Cl. 560-130.000.

Dammertz, Karl-Heinz: *See*—
Henne, Heinrich; Dammertz, Karl-Heinz; Schneider, Lutz T.; and Blasczyk, Gotthard, 4,927,086, Cl. 241-80.000.

Damon, Robert E., II; and Wareing, James R., to Sandoz Pharm. Corp. Analogs of mevalonolactone and derivatives thereof. 4,927,851, Cl. 514-460.000.

Dampier, Michael S.; Prilik, Ronald J.; and Rapoport, Norman R., to International Business Machines Corporation. Multi-layer printed circuit board. 4,928,061, Cl. 324-158.00F.

Dana, David E.; and Morris, Steven J., to PPG Industries, Inc. Chemically treated glass fibers for reinforcing polymers. 4,927,869, Cl. 523-502.000.

D'Angelo, Philip J.; Hetherington, Richard; and Rogan, Joseph J., to Epicor Incorporated. Composition for purifying liquids. 4,927,796, Cl. 502-62.000.

Daniel, Moshe: *See*—
Zilberman, Moshe; Livne, Mordechai; Tchetchick, Doron; and Daniel, Moshe, 4,926,684, Cl. 73-147.000.

Dannels, Wayne R.: *See*—
Lampman, David A.; Morich, Michael A; and Dannels, Wayne R., 4,928,063, Cl. 324-307.000.

Dannhaeuser, Friedrich, to Siemens Aktiengesellschaft. Method for code protection using an electronic key. 4,928,098, Cl. 340-825.560.

Dao, Tich T.; and Burke, Gary R., to Fairchild Semiconductor Corporation. Floating point microprocessor with directable two level microinstructions. 4,928,223, Cl. 364-200.000.

Darfler, Frederick J., to Cell Enterprises, Inc. Cell culture medium with antioxidant. 4,927,762, Cl. 435-240.310.

D'Aria, Giovanna; and Taricco, Giorgio, to Societa' Italiana per L'Esercizio Delle Telecomunicazioni P.A. Decoding method and device with erasure detection for multilevel transmission systems. 4,928,288, Cl. 375-17.000.

Darlington, Rex F. Compound bow with adjustable cable length. 4,926,832, Cl. 124-25.600.

Darlington, Rex F. Compound bow with adjustable cable anchor. 4,926,833, Cl. 124-23.100.

Date, Nobuaki: *See*—
Tsunekawa, Tokuichi; Date, Nobuaki; Aizawa, Hiroshi; Hosoe, Kazuya; and Urushibara, Kazunori, 4,928,184, Cl. 358-335.000.

Daunt, N. Charles. Elongated shower head. 4,927,083, Cl. 239-282.000.

Davenport, Kenneth G.: *See*—
Vicari, Richard; Aslam, Mohammad; Ray, Wilson B.; Davenport, Kenneth G.; Dammel, Ralph; Lingnau, Juergen; and Doessel, Karl-Friedrich, 4,927,956, Cl. 560-130.000.

Davey, John E.; and Christou, Aristos, to United States of America, Navy. Method of making self-aligned GaAs/AlGaAs FET's. 4,927,782, Cl. 437-184.000.

Davidson, James B.; Kaz, Peter N.; Kidwell, Michael H.; and Zachman, Mark E., to Spectra Physics, Inc. Method and apparatus for controlling motorgrader cross slope cut. 4,926,948, Cl. 172-4.500.

Davidson, William C.: *See*—
Morris, Guy D.; Jordon, Trevor A.; Davidson, William C.; and Bowman, Timothy J., 4,926,802, Cl. 123-52.00M.

Davies, David K.: *See*—
Goutzoulis, Anastosios P.; and Davies, David K., 4,928,310, Cl. 180-46.000.

Davies, Peter N.: *See*—
Field, John E.; Dear, John P.; and Davies, Peter N., 4,926,859, Cl. 128-24.00A.

Davies, Theodore E.: *See*—
Watson, James E.; and Davies, Theodore E., 4,926,842, Cl. 126-360.00R.

Davis, Bryan T.: *See*—
Wright, William E.; Davis, Bryan T.; Matteson, Donald S.; and Knapp, Gordon G., 4,927,553, Cl. 252-49.600.

Davis, Daniel W. Ambulatory wheelstand. 4,927,167, Cl. 280-250.100.

Davis, Frederick B., Jr. Aquatic wheelchair. 4,926,777, Cl. 114-270.000.

Davis, George M. Board game apparatus. 4,927,145, Cl. 273-94.000.

Davis, Walter L.: *See*—
Grandfield, Walter J.; Mittel, James G.; and Davis, Walter L., 4,928,314, Cl. 455-236.000.

Davison, Samuel H.; Kast, Kevin H.; and Clark, Aidan W., to General Electric Company. Active clearance control. 4,928,240, Cl. 364-431.020.

Dawn, Douglas D.; and Radermacher, Reinhard, to Pennwalt Corporation. Refrigerant fluid and method of use. 4,926,650, Cl. 62-114.000.

Day, Stanley G., to General Electric Company. Aircraft propeller control. 4,928,241, Cl. 364-424.010.

Dayan, Richard A.: *See*—
Agoglia, Robert J.; Dayan, Richard A.; and Smith, Bruce A., 4,928,193, Cl. 360-78.040.
Bealkowski, Richard; Dayan, Richard A.; Doria, David J.; Kinnear, Scott G.; Krantz, Jeffrey I.; Liverman, Robert B.; Sotomayor, Guy G.; Williams, Donald D.; and Vaiskauckas, Gary A., 4,928,237, Cl. 364-200.000.

Dayco Products, Inc.: *See*—
Meadows, Roger D.; Rush, James B.; and Bryan, James S., 4,926,535, Cl. 29-890.144.

de la Motte, Rebecca S.: *See*—
Wagner, Frederick W.; de la Motte, Rebecca S.; and Dean, Maria A., 4,927,920, Cl. 536-119.000.

de la Rosa, Francisco F.; Navarro, Jose A.; Roncel, Mercedes; and de la Rosa, Miguel A., to Interox (Societe Anonyme). Process for production of hydrogen peroxide by a chemical photoreduction of oxygen, and hydrogen peroxide obtained by this process. 4,927,512, Cl. 204-157.500.

de la Rosa, Miguel A.: *See*—
de la Rosa, Francisco F.; Navarro, Jose A.; Roncel, Mercedes; and de la Rosa, Miguel A., 4,927,512, Cl. 204-157.500.

Dean, Kenneth D.: *See*—
Zielke, Darrell W.; and Dean, Kenneth D., 4,926,616, Cl. 53-585.000.

Dean, Maria A.: *See*—
Wagner, Frederick W.; de la Motte, Rebecca S.; and Dean, Maria A., 4,927,920, Cl. 536-119.000.

Dean, Robert W., Jr., to Stonewall Landscape Systems, Inc. Retaining wall cap unit. 4,926,595, Cl. 52-300.000.

Dear, John P.: *See*—
Field, John E.; Dear, John P.; and Davies, Peter N., 4,926,859, Cl. 128-24.00A.

Debortoli, George; and Cristescu, Alex G., to Northern Telecom Limited. Electrical connector for electrical connection to insulation displacement terminals. 4,927,375, Cl. 439-357.000.

DeCanio, Paul J. Cooling tower overflow drain cap. 4,927,439, Cl. 55-385.100.

DeCel Incorporated: *See*—
Emerson, Richard C.; and Sherman, John B., 4,927,099, Cl. 244-152.000.

Deforrest, William, Sr., to Major Lock Supply Inc. Extension for mortise cylinder. 4,926,670, Cl. 70-374.000.

de Groot, Peter J.; Macomber, Steven H.; and Gallatin, Gregg M., to Perkin-Elmer Corporation, The. Position and velocity imaging system using 2-D laser diode array. 4,927,263, Cl. 356-5.000.

Deininger, William D.; and King, David Q., to United States of America, National Aeronautics and Space Administration. High temperature refractory member with radiation emissive overcoat. 4,928,027, Cl. 310-11.000.

de Jong, Anno: *See*—
Frobel, Klaus; Muller, Hartwig; Bischoff, Erwin; Salcher, Olga; de Jong, Anno; Berschauer, Friedrich; and Scheer, Martin, 4,927,810, Cl. 514-23.000.

Delacourt, Dominique: *See*—
Papuchon, Michel; Pocholle, Jean-Paul; and Delacourt, Dominique, 4,927,245, Cl. 350-354.000.

De Lassauniere, Chabrier; and Colote, Acaye S., to Societe de Conseils de Recherches et d'Applicatios Scientifiques (S.C.R.A.S.). Process for preparing polynucleotides. 4,927,755, Cl. 435-91.000.

DeLuca, Hector F.; Schnoes, Heinrich K.; Perlman, Kato L.; and Kutner, Andrzej, to Wisconsin Alumni Research Foundation. Compounds effective in inducing cell differentiation and process for preparing same. 4,927,815, Cl. 514-167.000.

Delzer, Scott H.: *See*—
Knudsen, Arne K.; Delzer, Scott H.; and Langhoff, Charles A., 4,928,254, Cl. 364-556.000.

Delzio, Robert J. Charade and drawing card game using dice. 4,927,147, Cl. 273-146.000.

Demeter, Jozsef; Zoltai, Tibor; and Navarro, Hector D. Electric motor. 4,928,051, Cl. 318-731.000.

Demor, Edward J., III; Hinkel, Walter W.; and Lukich, Lewis T., to Goodyear Tire & Rubber Company, The. Pneumatic tire. 4,926,918, Cl. 152-154.000.

Demosthene, Claude: *See*—
Douglas, James L.; Fabre, Guy; and Demosthene, Claude, 4,927,970, Cl. 564-462.000.

De Moura, Wilson G.: *See*—
Souto, Sadario O.; and De Moura, Wilson G., 4,927,861, Cl. 521-99.000.

Denda, Toshio: *See*—
Teraoka, Kazuharu; Satake, Mitsuo; Denda, Toshio; Katayama, Takashi; and Seyasu, Shiro, 4,928,229, Cl. 364-464.010.

Denki Kagaku Kogyo Kabushiki Kaisha: *See*—
Isozaki, Kei; Hirashima, Yutaka; and Imamura, Yasuo, 4,927,791, Cl. 501-87.000.

Dennison Manufacturing Company: *See*—
Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.

Denz, Martin: *See*—
Wenger, Hartmut; Martin, Peter; Rotzinger, Hans; and Denz, Martin, 4,926,789, Cl. 118-668.000.

Denzer, Diana K.: *See*—
Rioja, Roberto J.; and Denzer, Diana K., 4,927,469, Cl. 148-11.50A.

Depeige, Alain, to Aerospatiale Societe Nationale Industrielle. Mechanism for fastening a life-saving device of the simple evacuation slide or dinghy type for aircraft. 4,927,098, Cl. 244-137.200.

Deputat, Julian: *See*—
Brokowski, Andrzej; Deputat, Julian; and Mizerski, Krzysztof, 4,926,692, Cl. 73-597.000.

DeRudder, James L.; Savenije, Herman; and Wang, I-Chung W., to General Electric Company. Low gloss molded articles using polyorganosiloxane/polyvinyl-based graft polymers. 4,927,880, Cl. 525-63.000.

Desbos, Gilbert: *See*—
Bablon, Guy P.; and Desbos, Gilbert, 4,927,543, Cl. 210-711.000.

Desons, Roger: *See*—
Brumme, Reinhold; and Desons, Roger, 4,927,122, Cl. 267-140.100.

Deucher, Joseph S.: *See*—
Zupancic, Anton Z.; and Deucher, Joseph S., 4,928,292, Cl. 378-17.000.

Deussen, Heino; and Deussen, Werner, to Stella KG Werner Deussen. Ampul. 4,926,915, Cl. 141-290.000.

Deussen, Werner: *See*—
Deussen, Heino; and Deussen, Werner, 4,926,915, Cl. 141-290.000.

Deutsch Forschungsanstalt fur Luft- und Raumfahrt e.V.: *See*—
Dietrich, Johannes; and Gombert, Bernd, 4,926,708, Cl. 74-424.80C.

Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V.: *See*—
Furstenau, Norbert; and Watts, Christopher, 4,928,007, Cl. 341-137.000.
Lorenz, Dieter, 4,928,012, Cl. 250-338.100.

Deutz-Allis Corporation: *See*—
Murray, David L., 4,927,165, Cl. 280-43.230.

Devaux, Francois; Herail, Norbert; Lefevre, Denis; and Lehuede, Jean-Pierre, to Thomson-CSF. Tunable microwave coupler with mechanically adjustable conductors. 4,928,077, Cl. 333-111.000.

Devices for Vascular Intervention, Inc.: *See*—
Gifford, Hanson S., III; Simpson, John B.; and Brown, Peter S., 4,926,858, Cl. 606-159.000.

DeVillez, Richard L.; and Scher, Richard K. Method for enhancement of unguis growth. 4,927,626, Cl. 424-61.000.

Devins, John C.: *See*—
Reed, Clive W.; Rzad, Stefan J.; and Devins, John C., 4,927,704, Cl. 428-221.000.

Devtech, Inc.: *See*—
Beck, Martin H., 4,927,679, Cl. 428-36.920.

DeVuono, Anthony C.: *See*—
Christensen, Richard N.; DeVuono, Anthony C.; Wilkinson, William H.; and Landstrom, D. Karl, 4,926,659, Cl. 62-476.000.

Dewhurst, Katharine H. Inertial impaction air sampling device. 4,926,679, Cl. 73-28.000.

Dewulf, Frans: *See*—
van Opstal, Martin; Dewulf, Frans; Cleenewerck, Bernard; and Weber, Ernst, 4,927,544, Cl. 210-712.000.

Dhanakoti, Padmanabhan; Moore, Gerry W.; and Smith, Harold F., to International Business Machines Corporation. Antistatic mask for use with electronic test apparatus. 4,927,692, Cl. 428-137.000.

Dhein, Rolf: *See*—
Schreckenberg, Manfred; Dhein, Rolf; Rudolph, Hans; and Nouvertne Werner, 4,927,903, Cl. 528-176.000.

Dhillon, Major S.: *See*—
Walls, John E.; Tellechea, Carlos; and Dhillon, Major S., 4,927,737, Cl. 430-278.000.

Dhong, Sang H.; Lu, Nicky C.; and Henkels, Walter H., to International Business Machines Corporation. Complementary metal-oxide-semiconductor transistor and one-capacitor dynamic-random-access memory cell and fabrication process therefor. 4,927,779, Cl. 428-52.000.

Diaz, Stephen H.; Cherian, Gabe; Morris, Stephen; Vinson, John R.; Crofts, David; and Moore, Anthony J., to Raychem Limited. Circuit protection device. 4,928,199, Cl. 361-56.000.

Dickie, Robert G., to Paige Manufacturing Company, Inc. Electrical safety receptacle assembly. 4,927,373, Cl. 439-188.000.

Dickie, Robert G., to Paige Manufacturing Company Incorporated. Electrical plug assembly and system. 4,927,376, Cl. 439-484.000.

Dickins, John S., III: *See*—
Agers, Brian M.; and Dickins, John S., III, 4,926,661, Cl. 68-200.000.

Di Cristina, Natale: *See*—
Spatrisano, Antonio P.; Gandolfi, Luciano; Minotti, Carlo; and Di Cristina, Natale, 4,926,547, Cl. 29-841.000.

Diehl GmbH & Co.: *See*—
Wittman, Jurgen; von Entress-Furstenecck, Wolfgang; and Thurner, Gunther, 4,926,751, Cl. 102-348.000.

Diehl Pojedinec, Edward P. Container with tamper indicator using piped light. 4,927,036, Cl. 215-203.000.

Diehl, Roy E.; and Berger, Alvin H., to Ford Motor Company. Engine vibration balancer. 4,926,810, Cl. 123-192.00B.

Dieken, Alan P.: *See*—
Dufresne, Joel R.; and Dieken, Alan P., 4,926,864, Cl. 128-421.000.

Diesel Kiki Co., Ltd.: *See*—
Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, 4,926,906, Cl. 137-625.300.
Nakamura, Hisashi; Takahashi, Satoshi; Ikeda, Takayuki; and Ogino, Masaaki, 4,926,902, Cl. 137-493.300.
Noguchi, Ichiro, 4,926,651, Cl. 62-133.000.

Dietrich, Johannes; and Gombert, Bernd, to Deutsch Forschungsanstalt fur Luft- und Raumfahrt e.V. Apparatus for converting rotary motion into axial motion. 4,926,708, Cl. 74-424.80C.

Dighton, Gaylon L., to Dow Chemical Company, The. Apparatus and method for draining a viscous material from a vessel. 4,926,894, Cl. 137-15.000.

Digital Equipment Corporation: *See*—
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.
Gabbe, David; and Batchelder, Ned, 4,928,252, Cl. 364-519.000.
Leis, Michael D., 4,928,075, Cl. 331-17.000.

Dikeman, Roxane: *See*—
Barnett, Ronald E.; Dikeman, Roxane; Liao, Shyh-Yuan; Gill, John; and Pantaleone, David P., 4,927,654, Cl. 426-548.000.

DiMarco, Bernard; and Kaufman, Steven A., to Siemens Energy & Automation, Inc. Fastening means. 4,927,308, Cl. 411-437.000.

Dingeman, Drake D., to Systran Corporation. Apparatus and method for binary data transmission. 4,928,289, Cl. 375-20.000.

Dinsmoor, John C.: *See*—
Gale, Edwin J.; Olsen, Albert B.; and Dinsmoor, John C., 4,928,202, Cl. 361-215.000.

DiPirro, Steven D.: *See*—
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.

DiRubbio, Vincent; and Galinski, Edmund V. Safety fuze for a hand grenade. 4,926,752, Cl. 102-486.000.

Dive, Georges: *See*—
Pirotzky, Eduardo; Dive, Georges; Godfroid, Jean-Jacques; and Heymans, Francoise, 4,927,825, Cl. 514-255.000.

Dix, Barry M.: *See*—
Small, Richard F.; Patel, Dakshesh S.; Barrow, Lascelle A.; and Dix, Barry M., 4,927,663, Cl. 427-40.000.

Dixon, John: *See*—
Brown, Roger C.; Dixon, John; and Robinson, David H., 4,927,822, Cl. 514-236.200.

DK-Gleason, Inc.: *See*—
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Dodd, Richard E., to North American Dynamics. Quick release gun mount assembly. 4,926,743, Cl. 89-40.140.

Doe Run Tooling, Inc.: *See*—
Hunter, Jerry J., 4,927,125, Cl. 269-74.000.

Doemen, Benno, to Papst-Motoren GmbH & Co. KG. Circuit arrangement for generating a measurement signal associated with the frequency of an alternating current signal. 4,928,045, Cl. 318-464.000.

Doessel, Karl-Friedrich: *See*—
Vicari, Richard; Aslam, Mohammad; Ray, Wilson B.; Davenport, Kenneth G.; Dammel, Ralph; Lingnau, Juergen; and Doessel, Karl-Friedrich, 4,927,956, Cl. 560-130.000.

Doi, Atsuhiro; and Nishio, Tomonori, to Fuji Photo Film Co., Ltd. Exposure head. 4,928,122, Cl. 346-160.000.

Dolan, Michael S., to Serpentix Conveyor Corporation. Internally stabilized slide conveyor. 4,927,006, Cl. 198-822.000.

Dolfini, Joseph E.; Glinka, Jerome; and Bosch, Andrew C., to Mallinckrodt, Inc. Hydrolysis of curcumin. 4,927,805, Cl. 512-27.000.

Domsa, Karoly: *See*—
Harsanyi, Jozsef; Kohanyi, Laszlo ; Domsa, Karoly; Szakacs, Lajos; Szentgyorgyi, Geza; and Imre, Aladar, 4,927,549, Cl. 252-25.000.

Domschat, Klaus, to Eltex-Elektrostatik-Gesellschaft mbH. High voltage electrode device. 4,928,198, Cl. 361-1.000.

Donat, Frank J.: *See*—
Backderf, Richard H.; and Donat, Frank J., 4,927,886, Cl. 525-261.000.

Dong, Walter; Shaw, Paul V.; and Buechele, James L., to Shell Oil Company. Process for continuous purification of bisphenols. 4,927,973, Cl. 568-724.000.

Dong, Walter: *See*—
Buechele, James L.; Nielsen, Edward L.; Dong, Walter; and Shaw, Paul V., 4,927,978, Cl. 568-724.000.
Donle, David W., to Dow Chemical Company, The. Cleaning gas turbine inlet air. 4,926,620, Cl. 55-89.000.
Donnelly, Susan P., to Mobil Oil Corporation. Addition of shape selective zeolites to catalytic cracking units. 4,927,523, Cl. 208-120.000.
Doppstadt, Werner. Sieve device for sieving out compost from rotten organic material. 4,927,528, Cl. 209-240.000.
D'Orazio, Vincent T.; and O'Brien, Robert B. Soluble fish-attractant coating, coated lure, and coating composition and method. 4,927,643, Cl. 426-1.000.
Doria, David J.: *See*—
Bealkowski, Richard; Dayan, Richard A.; Doria, David J.; Kinnear, Scott G.; Krantz, Jeffrey I.; Liverman, Robert B.; Sotomayor, Guy G.; Williams, Donald D.; and Vaiskauckas, Gary A., 4,928,237, Cl. 364-200.000.
Dorman, Frank, to University of Minnesota, Regents of the. Cardiac assist pump with steady rate supply of fluid lubricant. 4,927,407, Cl. 600-16.000.
Dorn, Allan R., to Simpson, Jeanette. Reagent for cell separation. 4,927,749, Cl. 435-2.000.
Dorn, Allan R., to Simpson, Jeanette. Cell separation process. 4,927,750, Cl. 435-2.000.
Dorn, Gordon L.; and Johnson, Michael A., to Wadley Technologies, Inc. Specimen collection and sampling container. 4,927,605, Cl. 422-102.000.
Dornauf, Andrea: *See*—
Tauber, Gunter; and Dornauf, Andrea, 4,927,518, Cl. 204-421.000.
Dorri, Bizhan; and Brzozowski, Steven J., to General Electric Company. Cryogenic precooler for superconductive magnets. 4,926,646, Cl. 62-51.100.
Dorri, Bizhan; and Laskaris, Evangelos T., to General Electric Company. Cryogenic precooler and cryocooler cold head interface receptacle. 4,926,647, Cl. 62-51.100.
Doster Warehouse: *See*—
Chastain, Jack T.; and McWhorter, John, 4,927,030, Cl. 209-620.000.
Douglas, James L.; Fabre, Guy; and Demosthene, Claude, to Bristol-Myers Company. Substituted 3-cyclobutene-1,2-dione intermediates. 4,927,970, Cl. 564-462.000.
Douglass, Gary W.: *See*—
Sanford, David L.; and Douglass, Gary W., 4,927,187, Cl. 285-80.000.
Doulbe-E Inc.: *See*—
Wilson, James A., 4,927,112, Cl. 251-1.300.
Dow Chemical Company, The: *See*—
Asensio, Javier; and Hayman, Richard, 4,927,684, Cl. 428-91.000.
Beck, Henry N.; and Mahoney, Robert D., 4,927,535, Cl. 210-500.230.
Bogan, Gary W., 4,927,905, Cl. 528-205.000.
Carson, Chrislyn M.; Copping, Leonard G.; Ehr, Robert J.; Gitlitz, Melvin H.; McNeil, Maynard W.; Street, Peter F. S.; and Liebeschuetz, John W., 4,927,812, Cl. 514-63.000.
Dighton, Gaylon L., 4,926,894, Cl. 137-15.000.
Donle, David W., 4,926,620, Cl. 55-89.000.
Frisch, Kurt C., Jr.; and Harris, Robert F., 4,927,864, Cl. 521-163.000.
Kirby, Neil V.; Street, Peter F. S.; and Markley, Lowell D., 4,927,833, Cl. 514-399.000.
Langer, Horst G., 4,927,614, Cl. 423-305.000.
Molzahn, David C.; Hartwell, George E.; and Bowman, Robert G., 4,927,931, Cl. 544-357.000.
Moore, Eugene R., 4,927,579, Cl. 264-101.000.
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Wessling, Ritchie A.; Whipple, Sharon S.; and Fibiger, Richard F., 4,927,540, Cl. 210-638.000.
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Nakashima, Kazutaka; and Saito, Kazuya, 4,927,788, Cl. 439-887.000.
Downey, Ernest L. Apparatus for separating vertebrae. 4,926,849, Cl. 128-75.000.
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Ohta, Kazumi; Kawaguchi, Sotoaki; Doyama, Hisao; and Yano, Yutaka, 4,927,457, Cl. 75-10.630.
Doyle, James H., to Unit Instruments, Inc. Fast response control circuit. 4,928,048, Cl. 318-644.000.
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., to Digital Equipment Corporation. Method and apparatus for the continuous and asynchronous traversal and processing of graphics data structures. 4,928,247, Cl. 364-518.000.
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Townsend, Leroy B.; and Drach, John C., 4,927,830, Cl. 514-258.000.
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Prescott, Robert C.; and Robinson, Robert J., 4,926,896, Cl. 137-82.000.
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Forrest, John, 4,926,949, Cl. 175-17.000.
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Seiford, Donald S., Sr., 4,926,755, Cl. 104-183.000.
D'Sa, Alwyn P.: *See*—
Hunt, Barry F.; D'Sa, Alwyn P.; and Magnin, Paul A., 4,928,231, Cl. 364-518.000.
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DSM Resins B.V.: *See*—
van Gasse, Rene L. E., 4,927,701, Cl. 428-212.000.
Du pont Canada Inc.: *See*—
Markiewicz, Stan J., 4,927,689, Cl. 428-34.800.
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Dubal, Hans-Rolf: *See*—
Bahr, Christian; Heppke, Gerd; Lotzsch, Detlef; Dubal, Hans-Rolf; Escher, Claus; and Ohlendorf, Dieter, 4,927,244, Cl. 350-350.00S.
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Baker, David J.; Dubuque, Kenneth J.; Estep, John M.; and Hix, Charles J., Jr., 4,927,114, Cl. 251-240.000.
Duckworth, Ralph M., to Lever Brothers Company. Toothpastes. 4,927,625, Cl. 424-52.000.
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Cordes, Harry D.; Duich, Michael B.; and Bailey, Gardner S., 4,927,434, Cl. 55-20.000.
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Biswas, Gautam; Black, David C.; Duncan, Michael G.; Key, Gary R.; Leak, Gordon D.; and Whittington, Robert D., 4,928,306, Cl. 379-201.000.
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Wellinga, Kobus; and Eussen, Jacobus H. H., 4,927,452, Cl. 71-92.000.
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Agers, Brian M.; and Dickins, John S., III, 4,926,661, Cl. 68-200.000.
Bartlett, Philip L.; and Creazzo, Joseph A., 4,927,863, Cl. 521-131.000.
Gee, Stephen K., 4,927,453, Cl. 71-92.000.
Lane, Gregg A.; and Pearlstine, Kathryn, 4,928,065, Cl. 324-464.000.
Lee, Kung H., 4,927,981, Cl. 570-255.000.
Medwin, Steven J., 4,927,581, Cl. 264-108.000.
Motz, Kaye L.; Latham, Roger A.; and Statz, Robert J., 4,926,582, Cl. 44-62.000.
Rushmere, John D., 4,927,498, Cl. 162-168.300.
Stout, Gary K., 4,927,733, Cl. 430-256.000.

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Duracraft Corporation: *See*—
Wang, Jui-Shang, 4,927,120, Cl. 248-676.000.
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Durchschlag, Gerald; Lang, Alfred; Rotter, Franz; Fritz, Dieter; and Kopilovitsch, Heinz, to Voest-Alpine Maschinenbau Gesellschaft m.b.H. Reversing device for movable parts within the deflection area of a railway switch. 4,927,102, Cl. 246-469.000.
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Kazior, Thomas E.; and Durschlag, Mark S., 4,927,784, Cl. 437-203.000.
Duthaler, Rudolf; Finter, Jurgen; Fischer, Walter; and Ramanathan, Visvanathan, to Ciba-Geigy Corporation. Anthraquinoylcarboxylic acid hydrazides, curable compositions and use thereof. 4,927,865, Cl. 522-48.000.
Dutton, Christopher J.; and Perry, David A., to Pfizer Inc. Novel C.25 (substituted (2-propenyl))-milbemycins. 4,927,847, Cl. 514-450.000.
Dutzmann, Stefan: *See*—
Wollweber, Detlef; Kramer, Wolfgang; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 4,927,844, Cl. 514-425.000.
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Dwyer, Francis G.: *See*—
Anderson, Conroy D.; Chou, Tai-Sheng; Cormier, William E., Jr.; Dwyer, Francis G.; Krambeck, Frederick J.; Pasquale, Gary M.; Schipper, Paul H.; and Stover, William A., 4,927,526, Cl. 208-152.000.
Dyer, Paul N.: *See*—
Garg, Diwakar; Wrecsics, Ernest L.; Schaffer, Leslie E.; Mueller, Carl F.; Dyer, Paul N.; and Fabregas, Keith R., 4,927,713, Cl. 428-627.000.
Dynamit Nobel Aktiengesellschaft: *See*—
Rieger, Benedikt, 4,926,574, Cl. 42-70.040.
D'Zurko, Daphne: *See*—
Morris, Arnold M.; D'Zurko, Daphne; Pilsbury, Richard H.; Barkell, J. Warren, Jr.; Orndorff, Karl B.; and Lawson Randall S., 4,926,974, Cl. 187-52.0LC.
E&E Seegmiller Limited: *See*—
Altmayer, Joseph, 4,927,089, Cl. 241-264.000.
Eagleair, Inc.: *See*—
Hagar, Donald K.; and McIntyre, Robert W., 4,927,351, Cl. 431-12.000.
Earl, Gregory K. Fuel vaporization apparatus. 4,926,831, Cl. 123-557.000.
Easter, Brian: *See*—
Kropielnicki, Jerzy J.; Easter, Brian; and Last, James D., 4,928,108, Cl. 343-704.000.
Easter, Michael D. Protective covering for video camera or the like. 4,927,017, Cl. 206-316.200.
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Abbas, Daniel C., 4,927,778, Cl. 437-51.000.
Bailey, David B.; Harrison, Daniel J.; and Yacobucci, Paul D., 4,927,803, Cl. 503-227.000.
Barton, James T.; and Walker, Jimmy P., 4,928,139, Cl. 355-1.000.
Brock, George W., 4,928,188, Cl. 360-113.000.
Elly, James E.; and Kosarko, Gerald J., 4,928,194, Cl. 360-97.040.
Fagerquist, Randy L.; Wood, Wendell L.; and Atkins, Frank W., 4,928,114, Cl. 346-75.000.
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Goswami, Ramanuj; and Chen, Chin H., 4,927,927, Cl. 544-106.000.
Henzel, Richard P.; and Zengerle, Paul L., 4,927,744, Cl. 430-566.000.
Hickok, William K.; Riley, John M.; and Kosarko, Gerald J., 4,928,196, Cl. 360-105.000.
Hipwell, William E. H., 4,928,178, Cl. 358-160.000.
Howell, Margene C.; Katerberg, James A.; Pipkorn, David N.; and Wood, Wendell L., 4,928,113, Cl. 346-75.000.
Irving, Mark E., 4,927,745, Cl. 430-567.000.
Kloosterman, David, 4,928,142, Cl. 355-218.000.
Rimai, Donald S.; and Sreekumar, Chandra, 4,927,727, Cl. 430-99.000.
Schwartz, Paul A., 4,927,746, Cl. 430-372.000.
Scozzafava, Michael; Tang, Ching W.; and Young, Ralph H., 4,927,726, Cl. 430-78.000.
Stavinoha, Jerome L.; and McCollum, Anthony W., 4,927,878, Cl. 525-44.000.
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Walker, Jimmy P.; and Barton, James T., 4,928,119, Cl. 346-108.000.
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Ebara Corp.: *See*—
Okumura, Katsuya; Kuriyama, Fumio; Murai, Yukio; Tsujimura, Manabu; and Sobukawa, Hiroshi, 4,926,648, Cl. 62-55.500.
Eberhardt, Paul R.: *See*—
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Ebesyu, Hidetaka, to Fujitsu Limited. Digital phase comparing circuit. 4,928,026, Cl. 307-479.000.
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Nagura, Satoru; Ebihara, Tsutomu; and Matsumoto, Toshihide, 4,927,682, Cl. 428-88.000.
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Koshizuka, Kunihiro; Tezuka, Toshiaki; Abe, Takao; and Ebisawa, Harue, 4,927,693, Cl. 428-141.000.
ECIA - Equipements Et Composants Pour L'Industrie Aubomobile: *See*—
Fourrey, Francois; and Mauffrey, Jean P., 4,927,210, Cl. 297-366.000.
ECIA - Equipements et Composants Pour L'Industrie Automobile: *See*—
Hobluigie, Audio; Barnabe, Jean-Pierre; and Mouhot, Frederic, 4,927,286, Cl. 403-322.000.
Eckenhoff, James B.; Cortese, Richard; and Landrau, Felix A., to Alza Corporation. Dispenser for delivering drug to livestock. 4,927,633, Cl. 424-438.000.
Eckler, Donald F.; Mankus, John R.; Ripp, Francis J.; and Saxenmeyer Jr., George J., to International Business Machines Corporation. Method and device for connection to wires in a flexible cable. 4,927,387, Cl. 439-499.000.
Edblad, Warren A.: *See*—
Staab, Carl J.; Houser, Kirk D.; Jones, Donald J.; Ihrman, Robert T.; Poepsel, Donald A.; and Edblad, Warren A., 4,928,097, Cl. 340-825.500.
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Ediger, Glen W.: *See*—
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Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.
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EFP Corporation: *See*—
Elzey, Paul B., 4,927,023, Cl. 206-523.000.
Egger, Walter C., to VT-Verpackungstechnik Zurich. Arrangement for lubricating the chain guide in a drag chain conveyor for loose articles. 4,926,971, Cl. 184-15.100.
Egis Gyogyszergyar: *See*—
Harsanyi, Jozsef; Kohanyi, Laszlo ; Domsa, Karoly; Szakacs, Lajos; Szentgyorgyi, Geza; and Imre, Aladar, 4,927,549, Cl. 252-25.000.
Eglise, David; and Lewis, Adrian, to Mars Incorporated. Two way communication token interrogation apparatus. 4,926,996, Cl. 194-212.000.
Eglise, David; and Ruddell, Alan J. Method and apparatus for communication for a data-storing token. 4,928,000, Cl. 235-380.000.
Eguchi, Kaoru: *See*—
Yamauchi, Junichi; Maejima, Kimiko; Eguchi, Kaoru; and Kabuyama, Noriko, 4,928,253, Cl. 364-521.000.
Eguchi, Kazuhiro: *See*—
Kushibe, Mitsuhiro; Eguchi, Kazuhiro; Funamizu, Masahisa; and Obba, Yasuo, 4,928,285, Cl. 372-45.000.
Egusa, Syun; Miura, Akira; and Gemma, Nobuhiro, to Kabushiki Kaisha Toshiba. Method for manufacturing organic thin film. 4,927,589, Cl. 264-259.000.
Ehr, Robert J.: *See*—
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Ehret, Barbara A.; and Pearce, James H., III, to Uarco Incorporated. Shipping label with price tag section. 4,927,179, Cl. 283-79.000.
Eick, Christopher D.; Worcester, Kenneth P.; and Williamson, John R., to Allied-Signal Inc. Low cost fuel supply system for gas turbine engines. 4,926,629, Cl. 60-39.281.
Eickmann, Karl. Radial piston hydraulic machine with piston having twelve circumferential fluid bearing pockets. 4,926,744, Cl. 92-58.000.
Eike, Mark E.: *See*—
Lilly, Carol E. H.; Moore, Loyd C.; Eike, Mark E.; and Barker, Nicholas E., 4,926,758, Cl. 108-43.000.
Eilon, Gabriel F.; and Thompson, Wayne J., to Merck & Co., Inc. N-(N-succinyl-L-leucyl)agmatine, related compounds and use in pharmacology. 4,927,965, Cl. 562-560.000.
Eisenberg, Eugene; Lindsay, Frederick E.; Evans, James J.; and Collins, Ronald H., to Mack Trucks, Inc. Wet/dry cylinder liner for high output engines. 4,926,801, Cl. 123-41.840.
Eisengiesserei Monforts GmbH & Co.: *See*—
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Electric Power Research Inst. Corp. of District of Columbia: *See*—
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Gerardin, Jean-Pierre, 4,928,152, Cl. 356-5.000.

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Ellis, Theron L., to International Business Machines Corporation. Method for making a flush surface laminate for a multilayer circuit board. 4,927,477, Cl. 156-182.000.

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Elly, James E.; and Kosarko, Gerald J., to Eastman Kodak Company. Anti-static support for a cartridge in a disk drive. 4,928,194, Cl. 360-97.040.

Elm Industry Co., Ltd.: *See—*
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Elscint Ltd.: *See—*
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Eltech Systems Corporation: *See—*
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Turley, Homer L.; Niksa, Marilyn J.; Pohto, Gerald R.; and Niksa, Andrew J., 4,927,717, Cl. 429-27.000.

Eltex-Elektrostatik-Gesellschaft mbH: *See—*
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Elzey, Paul B., to EFP Corporation. Spacer member and method of forming the same. 4,927,023, Cl. 206-523.000.

Emerson, Richard C.; and Sherman, John B., to DeCel Incorporated. Aerodynamic controllably vented pressure modulating drogue. 4,927,099, Cl. 244-152.000.

Emhart Industries, Inc.: *See—*
Miller, Theodore H., 4,927,193, Cl. 292-92.000.
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Emi, Makoto: *See—*
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Emori, Shinji: *See—*
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Enerco Technical Products, Inc.: *See—*
Haire, Allen; Abele, Alan C.; and Kuczek, Stanley W., 4,927,355, Cl. 431-329.000.

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Engelhard Corporation: *See—*
McShea, William T., III; and Yarrington, Robert M., 4,927,857, Cl. 518-703.000.

Engelhardt, John A., to Boehringer Mannheim Corporation. Elbow arthroplasty instrumentation and surgical procedure. 4,927,422, Cl. 606-79.000.

Engelsdorf, Kurt: *See—*
Taubitz, Bernd; Zieher, Peter; Kramer, Claus; Engelsdorf, Kurt; and Schuelke, Armin, 4,926,983, Cl. 188-299.000.

Engineering Dynamics Corporation: *See—*
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Olper, Marco; and Fracchia, Pierluigi, 4,927,510, Cl. 204-114.000.

Engles, Bruce E.: *See—*
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English, Daniel R.: *See—*
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Enterline, David L.; and Smith, Hugh L., to Ford Aerospace Corporation. Kinematic truss. 4,927,257, Cl. 350-631.000.

Environmental Technologies Group, Inc.: *See—*
Spangler, Glenn E.; Carrico, John P., Jr.; and Campbell, Donald N., 4,928,033, Cl. 313-345.000.

Environwear, Inc.: *See—*
Tommerson, David P.; and Brekkestran, Kevin L., 4,927,366, Cl. 439-37.000.

Envirotech Corporation: *See—*
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Enyo, Hiroji: *See—*
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Epicor Incorporated: *See—*
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Era, Susumu; Kobayashi, Setsuo; and Mukoh, Akio, to Hitachi Chemical Company, Ltd. Novel naphthalocyanine dye, method for preparing the same, and optical information recording medium employing the same. 4,927,735, Cl. 430-270.000.

Erbil, Ahmet, to Georgia Tech Research Corporation. Chemical vapor deposition of mixed metal oxide coatings. 4,927,670, Cl. 427-255.300.

Erdman, Timothy R.; Shippey, Michael A.; and Wollenberg, Robert H., to Chevron Research Company. Lubricating oil compositions containing a combination of a modified succinimide and a Group II metal overbased sulfurized alkylphenol. 4,927,551, Cl. 252-42.700.

Erickson, Duane. Method and apparatus for fletching arrows. 4,927,478, Cl. 156-185.000.

Escher, Claus: *See—*
Bahr, Christian; Heppke, Gerd; Lotzsch, Detlef; Dubal, Hans-Rolf; Escher, Claus; and Ohlendorf, Dieter, 4,927,244, Cl. 350-350.00S.

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Wuest, Willi; Eskuchen, Rainer; Esser, Herbert; and Leischner, Hasso, 4,927,946, Cl. 549-371.000.

ESPE Stiftung & Co. Produktions- und Vertriebs KG: *See—*
Purrmann, Robert; Guggenberger, Rainer; and Pieper, Gunter, 4,927,866, Cl. 523-115.000.

Esposito, Ruth. Foldable and sterilizable compartmentalized organizer. 4,927,073, Cl. 229-117.070.

Essary, William A.: *See—*
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Esser, Herbert: *See—*
Wuest, Willi; Eskuchen, Rainer; Esser, Herbert; and Leischner, Hasso, 4,927,946, Cl. 549-371.000.

Essex Group, Inc.: *See—*
Leckie, James H., 4,926,928, Cl. 164-452.000.

Estep, John M.: *See—*
Baker, David J.; Dubuque, Kenneth J.; Estep, John M.; and Hix, Charles J., Jr., 4,927,114, Cl. 251-240.000.

Ester, George C. Formulae and methods for sublingual ingestion of natural progesterone. 4,927,816, Cl. 514-177.000.

Etablissement Gersan: *See—*
Leaton, Timothy H., 4,927,004, Cl. 198-704.000.

Etablissements Mesnel S.A.: *See—*
Mesnel, Gerard, 4,926,600, Cl. 49-491.000.

Etablissements S.A.: *See—*
Vanotti, Gerard, 4,927,078, Cl. 238-349.000.

Ethyl Corporation: *See—*
Blocker, Wesley C.; Roark, David N.; and Hornbaker, Edwin D., 4,927,896, Cl. 526-93.000.
Marlett, Everett M., 4,927,616, Cl. 423-347.000.
Wright, William E.; Davis, Bryan T.; Matteson, Donald S.; and Knapp, Gordon G., 4,927,553, Cl. 252-49.600.

Ethyl Petroleum Additives, Inc.: *See—*
Lam, William Y., 4,927,552, Cl. 252-47.000.

Eussen, Jacobus H. H.: *See—*
Wellinga, Kobus; and Eussen, Jacobus H. H., 4,927,452, Cl. 71-92.000.

Eustache, Jacques: *See—*
Shroot, Braham; Eustache, Jacques; and Bernardon, Jean-Michel, 4,927,928, Cl. 544-154.000.

Evans, David W., to Bell & Howell Company. Angled conveyor for document packages. 4,927,133, Cl. 271-225.000.

Evans, James J.: *See—*
Eisenberg, Eugene; Lindsay, Frederick E.; Evans, James J.; and Collins, Ronald H., 4,926,801, Cl. 123-41.840.

Eveready Battery Company, Inc.: *See—*
Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., 4,927,720, Cl. 429-54.000.

Ewen, John A., to Fina Technology, Inc. Catalyst system for the polymerization of olefins. 4,927,797, Cl. 502-127.000.

Excellon Automation: *See—*
Hendricks, Ross D., 4,927,001, Cl. 198-463.500.

Exci-Tech Industries, Inc.: *See—*
King, Allen B.; and Perfetti, Thomas J., 4,927,176, Cl. 280-813.000.

Exxymol S.A.M.: *See—*
Gueyne, Jean; and Seguin, Marie-Christine, 4,927,952, Cl. 556-419.000.

Eylers, Dieter, to Gottlieb Roll GmbH & Co. Arrangement for fastening pocket clips to tubular parts of writing instruments. 4,926,525, Cl. 24-11.00F.

Ezaki, Joichiro; Ito, Yoshiaki; and Matsuzaki, Mikio, to TDK Corporation. Improved floating magnetic head for high density recording. 4,928,195, Cl. 360-103.000.

Fables, Wylci; and Park, Jore. Reconfigurable loop apparatus. 4,927,402, Cl. 446-487.000.

Fabre, Guy: *See—*
Douglas, James L.; Fabre, Guy; and Demosthene, Claude, 4,927,970, Cl. 564-462.000.

Fabregas, Keith R.: *See—*
Garg, Diwakar; Wrecsics, Ernest L.; Schaffer, Leslie E.; Mueller, Carl F.; Dyer, Paul N.; and Fabregas, Keith R., 4,927,713, Cl. 428-627.000.

Fagerquist, Randy L.; Wood, Wendell L.; and Atkins, Frank W., to Eastman Kodak Company. Air skiving system for ink jet printer start-up. 4,928,114, Cl. 346-75.000.

Fagerquist, Randy L.; Wood, Wendall L.; Atkins, Frank W.; and Bahl, Surinder K., to Eastman Kodak Company. Continuous ink jet printer having remotely operable print head assembly. 4,928,115, Cl. 346-75.000.

Fairchild Semiconductor Corporation: *See—*
Dao, Tich T.; and Burke, Gary R., 4,928,223, Cl. 364-200.000.

Fakombinat: *See—*
Alpar, Tibor; Gyorvari, Janos; and Schmidt, Erno , 4,927,573, Cl. 264-40.100.

Falk, Leonard P.; and Griner, Paul K., to UniDynamics Corporation. Multiple-product merchandising machine. 4,927,051, Cl. 221-12.000.

Fani, Frank P.; and Mikic, Frank. Hair cutting guide. 4,926,891, Cl. 132-214.000.

Fanuc Ltd.: *See*—
Fujioka, Yoshiki; and Hirota, Mitsuhiko, 4,928,052, Cl. 318-762.000.
Ikebe, Yo; and Oku, Hideaki, 4,928,009, Cl. 250-231.130.

Farmont, Rolf. Sun roof for vehicles. 4,927,208, Cl. 296-216.000.

Farnam, Jeffrey. Four-wheel drive wheelchair with compound wheels. 4,926,952, Cl. 180-6.500.

Farney, Robert F.: *See*—
Algieri, Aldo A.; and Farney, Robert F., 4,927,968, Cl. 549-451.000.

Farrington, Allan P.: *See*—
Marshall, Gerald M.; Hull, Raymond, Jr.; and Farrington, Allan P., 4,927,685, Cl. 428-74.000.

Fassman, Arnold; and Nobile, John R., to Pitney Bowes Inc. Envelope flap moistening apparatus. 4,926,787, Cl. 118-32.000.

Fattal, R. George; and Ringrose, Gordon, to Twinpak Inc. System for applying labels to pallets movable along a conveyor line. 4,927,486, Cl. 156-351.000.

Fauck, Gerhard; Pohl, Wolfgang; and Ulrich, Helmut, to WABCO Westinghouse Fahrzeugbremsen GmbH. Relay valve for pneumatic or hydraulic application. 4,926,907, Cl. 137-627.500.

Fauth, Frederick E., Sr.; and Barkley, Paul E., to American Bottlers Equipment Co., Inc. Right angle flow-through jump transfer conveyor system. 4,926,999, Cl. 198-358.000.

Favors, Alexander L. Anti-collision sensor. 4,928,101, Cl. 340-943.000.

Fay, Hubert, to Institut Francais du Petrole. Method for determining the wear of the cutting means of a tool during drilling a rocky formation. 4,926,686, Cl. 73-151.000.

Fayt, Roger: *See*—
Teyssie, Philippe; Varshney, Sunil K.; Jerome, Robert; and Fayt, Roger, 4,927,703, Cl. 428-220.000.

Feco Engineered Systems, Inc.: *See*—
Bowler, Peter T.; and Zeeff, Thomas J., 4,927,205, Cl. 294-94.000.

Feder, Joseph; Howard, Susan C.; Wittwer, Arthur J.; Rademacher, Thomas W.; Parekh, Raj B.; and Dwek, Raymond A., to Monsanto Company. Tissue plasminogen activator from normal human colon cells. 4,927,630, Cl. 424-94.640.

Federowsky, Robert: *See*—
Soszka, Barbara; Federowsky, Robert; and Mahler, Jacques, 4,927,445, Cl. 65-11.100.

Felauer, Ethel Ellen: *See*—
Brouwer, Walter G.; Felauer, Ethel Ellen; and Bell, Allyn Roy, 4,927,451, Cl. 71-92.000.

Fennell, Cheryl A.; and Fennell, Kathy L. Locking device for windows/sliding doors. 4,927,198, Cl. 292-306.000.

Fennell, Kathy L.: *See*—
Fennell, Cheryl A.; and Fennell, Kathy L., 4,927,198, Cl. 292-306.000.

Fenyo, Martha; Borberg, Helmut; and Kadar, Janos G., to Harrier Inc. Method for in vivo treatment of tumorous tissues on body surfaces. 4,926,861, Cl. 128-395.000.

Ferber, Hubert P.: *See*—
Binder, Dieter; Rovenszky, Franz; and Ferber, Hubert P., 4,927,821, Cl. 514-226.500.

Ferguson, David G.: *See*—
Cozine, Mark L.; Ferguson, David G.; Hansen, Loren F.; and Lamb, Mark E., 4,926,947, Cl. 172-22.000.

Ferrari, Carlo V. G. Exercise apparatus. 4,927,138, Cl. 272-70.000.

Ferrett, Donald A., to United States of America, Army. Method of thermal isolation of detector elements in an uncooled staring focal plane array. 4,927,771, Cl. 437-3.000.

Ferrofluidics Corporation: *See*—
Raj, Kuldip; Moses, Joseph; Moskowitz, Ronald; and Bloom, Frank, 4,927,164, Cl. 277-80.000.

Fest, Christa; Muller, Klaus-Helmut; Pfister, Theodor; Riebel, Hans-Jochem; Kysela, Ernst; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Robert H., to Bayer Aktiengesellschaft. Substituted 1-benzylsulphonyl-3-heteroaryl-(thio)urea herbicides. 4,927,454, Cl. 71-93.000.

Feuz, Fritz, to Von Roll Transportsysteme AG. Cable way for suspended vehicles. 4,926,754, Cl. 104-112.000.

Fibiger, Richard F.: *See*—
Wessling, Ritchie A.; Whipple, Sharon S.; and Fibiger, Richard F., 4,927,540, Cl. 210-638.000.

Fibre Containers Pty. Limited: *See*—
Alexander, Kenneth G., 4,926,615, Cl. 53-564.000.

Fichtel & Sachs AG: *See*—
Kundermann, Wolfgang, 4,926,988, Cl. 192-3.300.

Fidler, Delmer A.: *See*—
Boudakian, Max M.; and Fidler, Delmer A., 4,927,940, Cl. 548-263.200.

Fiedler, Juergen; Stoeffler, Albert; and Bergmann, Michael, to Henkel Kommanditgesellschaft auf Aktien. Device for dispensing a multicomponent flowable substance. 4,927,059, Cl. 222-136.000.

Field, John E.; Dear, John P.; and Davies, Peter N. A medical treatment device for treating an undesired formation in a living body. 4,926,859, Cl. 128-24.00A.

Fieser, Josef, to Karl Mengele & Sohne Maschinenfabrik und Eisengiesserei GmbH & Co. Mowing apparatus. 4,926,623, Cl. 56-60.000.

Fina Technology, Inc.: *See*—
Ewen, John A., 4,927,797, Cl. 502-127.000.

Finegan, Jan P. Coin senser for pay telephone. 4,926,998, Cl. 194-315.000.

Finisar Corporation: *See*—
Levinson, Frank H., 4,927,225, Cl. 350-96.180.

Finley, John W.: *See*—
Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, 4,927,658, Cl. 426-611.000.

Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, 4,927,659, Cl. 426-611.000.

Finter, Jurgen: *See*—
Duthaler, Rudolf; Finter, Jurgen; Fischer, Walter; and Ramanathan, Visvanathan, 4,927,865, Cl. 522-48.000.

Fischer, Eugene R.: *See*—
Knox, David E.; and Fischer, Eugene R., 4,927,669, Cl. 427-239.000.

Fischer, Fritz; Kleinhappl, Erich; and Marsoner, Hermann, to AVL AG. Feeding device for introducing liquid or gaseous samples. 4,927,603, Cl. 422-67.000.

Fischer, Hanspeter: *See*—
Lutz, William R.; Verschueren, Wim G.; Fischer, Hanspeter; and Van Lommen, Guy R. E., 4,927,449, Cl. 71-90.000.

Fischer, Horst; and Staub, Karl, to Mannesmann Rexroth GmbH. Vane pump. 4,927,332, Cl. 417-299.000.

Fischer, Walter: *See*—
Duthaler, Rudolf; Finter, Jurgen; Fischer, Walter; and Ramanathan, Visvanathan, 4,927,865, Cl. 522-48.000.

Fischli, Albert; Gutknecht, Eva-Maria; and Obrecht, Daniel, to Hoffmann-La Roche Inc. Styryl ketones. 4,927,958, Cl. 560-53.000.

Fisons plc: *See*—
Brown, Roger C.; Dixon, John; and Robinson, David H., 4,927,822, Cl. 514-236.200.

Fitjer, Holger, to Georg Karl geka-brush GmbH. Applicator device with puncturing means. 4,927,283, Cl. 401-132.000.

Fitzgerald, Walter P.; Sanders, Beatrix Y.; and Bagheri, Mansour A. H., to Long-Lok Fasteners Corporation. Patch-type self-locking screw fasteners. 4,927,307, Cl. 411-302.000.

Fitzpatrick, Nicholas B., to BOC Group plc, The. Container content tester. 4,926,681, Cl. 73-52.000.

Flanigan, Sean: *See*—
Sampson, Robert; and Flanigan, Sean, 4,926,594, Cl. 52-200.000.

Flanigen, Edith M.: *See*—
Coughlin, Peter K.; Mercer, William C.; and Flanigen, Edith M., 4,927,768, Cl. 436-172.000.

Flannagan, Stephen T.: *See*—
Nogle, Scott G.; Pelley, Perry H., III; Flannagan, Stephen T.; and Engles, Bruce E., 4,928,268, Cl. 365-230.030.

Flatley, Doris W.: *See*—
Hsu, Sheng T.; and Flatley, Doris W., 4,927,777, Cl. 437-44.000.

Fleischer, Erwin: *See*—
Hirsch, Albrecht; and Fleischer, Erwin, 4,927,548, Cl. 252-17.000.

Fletcher, Stephen R.: *See*—
Taylor, Edward C.; Beardsley, George P.; Shih, Chuan; and Fletcher, Stephen R., 4,927,828, Cl. 514-258.000.

Flexmedics Corporation: *See*—
Stice, James D.; Sievert, Chester E., Jr.; and Christian, Steven C., 4,926,860, Cl. 606-144.000.

Flora, David D.: *See*—
Legler, John G.; Folkerth, Harold E.; and Flora, David D., 4,926,916, Cl. 144-136.00R.

Flores, Jorge: *See*—
Chanock, Robert M.; Kapikian, Albert; Midthun, Karen; Flores, Jorge; Gorziglia, Mario; Hoshino, Yasutaka; and Peres-Schael, Irene, 4,927,628, Cl. 424-89.000.

Flow Design, Inc.: *See*—
Survil, Robert J.; and Weber, Robert T., 4,926,704, Cl. 73-866.500.

Flow-Rite Controls, Ltd.: *See*—
Campau, Daniel N., 4,927,568, Cl. 261-36.100.

FMC Corporation: *See*—
Butler, Lee D.; Orlando, Franklin P.; and Lenker, Don H., 4,927,440, Cl. 56-12.800.
Ungchusri, Tep; and Lemons, George D., 4,927,192, Cl. 285-305.000.

Fock, Jurgen; and Schedlitzki, Dietmar, to Th. Goldschmidt AG. Polyoxyalkylene ether having hydroxyl and sulfonate groups and their use in the preparation of dispersable polyurethanes. 4,927,961, Cl. 562-103.000.

Fohl, Artur, to TRW Repa GmbH. Drive device for restraining systems in motor vehicles. 4,927,175, Cl. 280-806.000.

Fohst, Manfred, to Lohmann GmbH & Co. KG. Shoe inner sole, particularly insole or welt. 4,926,570, Cl. 36-43.000.

Folkerth, Harold E.: *See*—
Legler, John G.; Folkerth, Harold E.; and Flora, David D., 4,926,916, Cl. 144-136.00R.

Ford Aerospace Corporation: *See*—
Enterline, David L.; and Smith, Hugh L., 4,927,257, Cl. 350-631.000.

Ford Motor Company: *See*—
Burba, Joseph C.; Landman, Ronald G.; Patil, Prabhakar B.; and Reitz, Graydon A., 4,928,227, Cl. 364-424.010.
Butler, James W.; Korniski, Thomas J.; and Colvin, Alex D., 4,928,015, Cl. 250-343.000.
Diehl, Roy E.; and Berger, Alvin H., 4,926,810, Cl. 123-192.00B.
Duffy, James J., 4,926,956, Cl. 180-142.000.
Jones, Bryan, 4,927,174, Cl. 280-777.000.
Morris, Guy D.; Jordon, Trevor A.; Davidson, William C.; and Bowman, Timothy J., 4,926,802, Cl. 123-52.00M.

Foreman, Kenneth M.; and Maciulaitis, Algirdas, to Grumman Corporation. Hypersonic gasdynamic laser system. 4,928,286, Cl. 372-90.000.

Forester, David R., to Betz Laboratories, Inc. Method for controlling fouling deposit formation in a liquid hydrocarbonaceous medium using multifunctional antifoulant compositions. 4,927,519, Cl. 208-48.0AA.

Forester, David R., to Betz Laboratories, Inc. Multifunctional antifoulant compositions. 4,927,561, Cl. 252-389.220.
Forrest, John, to Drilex Systems, Inc. Thermal shield for drilling motors. 4,926,949, Cl. 175-17.000.
Fortin, Michel: *See—*
Clemence, Francois; Frechet, Daniel; and Fortin, Michel, 4,927,832, Cl. 514-299.000.
Fory, Werner; and Meyer, Willy, to Ciba-Geigy Corporation. N-heterocyclosulfonyl-n'-pyrimidinylureas. 4,927,450, Cl. 71-91.000.
Fossum, Steven C.; Sedivy, J. Gregory; and Savick, Wayne K., to Innovex Inc. Self-zeroing pressure signal generator. 4,926,674, Cl. 73-4.00R.
Foster, Clark B.: *See—*
Haber, Terry M.; Smedley, William H.; Foster, Clark B.; and Lewis, John A., Jr., 4,927,019, Cl. 206-365.000.
Foster, George N.: *See—*
King, Roswell; E., III; Foster, George N.; and Petty, Herbert E., 4,927,898, Cl. 528-27.000.
Fourrey, Francois; and Mauffrey, Jean F., to ECIA - Equipements Et Composants Pour L'Industrie Aubomobile. Seat with an adjustable fold-down back. 4,927,210, Cl. 297-366.000.
Fox, Mark. Self-retracting step. 4,926,965, Cl. 182-89.000.
Fracchia, Pierluigi: *See—*
Olper, Marco; and Fracchia, Pierluigi, 4,927,510, Cl. 204-114.000.
Franchini, Elisabeth, to Societe Anonyme dite: Alcatel Espace. Radio-optical transmission system, in particular for space telecommunications. 4,928,317, Cl. 455-601.000.
Francis, Gaylord L.; and Martin, Francis W., to Corning Incorporated. Hybrid circuits and thick film dielectrics used therein. 4,927,711, Cl. 428-432.000.
Francotyop-Postalia GmbH: *See—*
Schleuchardt, Manfred, 4,926,990, Cl. 192-28.000.
Frankenreiter, Michael, to Hewlett-Packard Company. Method for measuring blood pressure and apparatus for automated blood pressure measuring. 4,926,873, Cl. 128-681.000.
Franklin, Douglas E.; Murphy, Maurice W.; and Palylyk, Richard A., to Powertech Labs, Inc. Apparatus and method for testing wooden poles. 4,926,691, Cl. 73-579.000.
Franklin, Hugh L.; Whatley, Leslie H.; and Klees, George N., to Rockwell International Corporation. Sinusoidal current sense and scaling circuit. 4,928,059, Cl. 324-123.00R.
Frazer-Nash Defence Systems Limited: *See—*
Griffin, Dennis; and Pearce, John R., 4,926,740, Cl. 89-1.819.
Frechet, Daniel: *See—*
Clemence, Francois; Frechet, Daniel; and Fortin, Michel, 4,927,832, Cl. 514-299.000.
Fricano, Gerald A. Combination cap hanger and visor press. 4,927,063, Cl. 223-84.000.
Friedman, Sonia: *See—*
Auerbach, Abraham; and Friedman, Sonia, 4,927,766, Cl. 436-44.000.
Friehmelt, Volker; Maier, Bernhard; Kohling, Alfons; and Schmitt, Rolf-Eberhard, to Battelle-Institut e.V. Method and device for breaking a disperse system in an electrochemical cell. 4,927,511, Cl. 204-151.000.
Frisch, Kurt C., Jr.; and Harris, Robert F., to Dow Chemical Company, The. Use of a polyamine as cell opener in polyurethane foam. 4,927,864, Cl. 521-163.000.
Fritz, Dieter: *See—*
Durchschlag, Gerald; Lang, Alfred; Rotter, Franz; Fritz, Dieter; and Kopilovitsch, Heinz, 4,927,102, Cl. 246-469.000.
Frobel, Klaus; Muller, Hartwig; Bischoff, Erwin; Salcher, Olga; de Jong, Anso; Berschauer, Friedrich; and Scheer, Martin, to Bayer Aktiengesellschaft. Efomycin G and it's use as yield promoter in animals. 4,927,810, Cl. 514-23.000.
Froehly, Claude: *See—*
Barthelemy, Alain; Maneuf, Serge; and Froehly, Claude, 4,928,282, Cl. 372-18.000.
Frohrib, Darrell A.: *See—*
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Ramalingam, Subbiah; and Frohrib, Darrell A., 4,927,300, Cl. 407-120.000.
Fromm, Ellsworth H.: *See—*
Schirmer, Robert M.; Fromm, Ellsworth H.; and Alquist, Henry E., 4,927,349, Cl. 431-10.000.
Frost, Charles, to Kimball Industries, Inc. Reversible flow valve for air isolated bases. 4,927,119, Cl. 248-550.000.
Frost, Martin; Horton, Bruce J.; and Tidd, Jonathan L., to University of Bristol. Centerless griading. 4,926,603, Cl. 51-165.770.
Froutzis, Andrew. Means for releasably anchoring vehicle seats. 4,927,201, Cl. 296-63.000.
Fuchigami, Mitsuru; Tachizawa, Shingo; and Ishiguro, Mamoru, to Mitsubishi Paper Mills Ltd. Desensitizer composition. 4,927,971, Cl. 564-505.000.
Fuchigami, Yasuhiro: *See—*
Honjo, Seiichiro; Yamada, Kazuo; Fuchigami, Yasuhiro; and Mizusugi, Tetsuya, 4,927,443, Cl. 65-273.000.
Fuchs, Hugo; and Agar, David, to BASF Aktiengesellschaft. Elimination of hydroxylammonium salts from wastewaters containing such salts. 4,927,542, Cl. 210-711.000.
Fuel Tech, Inc.: *See—*
Bowers, Wayne E., 4,927,612, Cl. 423-235.000.
Fuhrer, Wolfgang: *See—*
Adler, Alfons; Widdig, Arno; Kuhle, Engelbert; Fuhrer, Wolfgang; Hagemann, Hermann; and Hanssler, Gerd, 4,927,824, Cl. 514-241.000.
Fuji Jukogyo Kabushiki Kaisha: *See—*
Abe, Kunihiro; and Furuyama, Masaaki, 4,926,822, Cl. 123-414.000.
Ishizeki, Seiichi, 4,926,683, Cl. 73-118.100.
Takahashi, Akira; and Soejima, Yuji, 4,927,166, Cl. 280-91.000.
Fuji Photo Film Co., Ltd.: *See—*
Chino, Naoyoshi; Sato, Tsunehiko; Saito, Shinji; and Ogawa, Hiroshi, 4,927,665, Cl. 427-131.000.
Doi, Atsuhiro; and Nishio, Tomonori, 4,928,122, Cl. 346-160.000.
Kawata, Ken; Sato, Kozo; and Tsuboi, Masayoshi, 4,927,897, Cl. 526-240.000.
Matsumoto, Takashi; Sato, Masamichi; Yoshida, Satoshi; and Kato, Yoshiaki, 4,928,186, Cl. 360-21.000.
Monma, Hisayoshi; and Suganuma, Atsushi, 4,928,277, Cl. 369-116.000.
Mori, Nobufumi; Muraishi, Katsuaki; Matsuda, Terumi; Ohnishi, Masahiro; Nunome, Hiromi; Koyama, Tadao; and Oikawa, Tetsuo, 4,928,016, Cl. 250-440.100.
Ogawa, Masaharu, 4,926,567, Cl. 34-23.000.
Sato, Kazo, 4,927,730, Cl. 430-138.000.
Shimura, Kazuo, 4,928,011, Cl. 250-327.200.
Takahashi, Kimihide; Sasaki, Hidemi; and Nakayama, Yoshiaki, 4,928,179, Cl. 358-210.000.
Takahashi, Ryuichi, 4,927,731, Cl. 430-138.000.
Takase, Haruo; Uenaka, Kazushige; Abe, Akira; and Fujita, Yoshihiro, 4,927,533, Cl. 210-257.100.
Tamagawa, Shigehisa, 4,927,495, Cl. 162-135.000.
Tamoto, Koji, 4,927,743, Cl. 430-496.000.
Tatsumi, Setsuji; Shiota, Kazuo; Urabe, Hitoshi; and Shimazaki, Osamu, 4,928,167, Cl. 358-80.000.
Fuji Xerox Co., Ltd.: *See—*
Kobayashi, Kenichi, 4,928,161, Cl. 357-71.000.
Ishide, Hiroo; and Kaneko, Shintaro, 4,927,725, Cl. 430-54.000.
Fujie, Hideo: *See—*
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Fujieda, Yasuhiko: *See—*
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katumi; and Fukumura, Seisuke, 4,927,344, Cl. 425-28.100.
Fujii, Katsuhiko: *See—*
Kitahara, Shigehisa; Ohtsu, Akira; and Fujii, Katsuhiko, 4,927,808, Cl. 514-19.000.
Fujii, Shokichi: *See—*
Higuchi, Mitsuhiro; Yamamoto, Hirofumi; Yamamoto, Osamu; Fujii, Shokichi; and Nonomura, Katsumi, 4,926,505, Cl. 4-247.000.
Fujikawa, Junichi: *See—*
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Fujimoto, Sachito; and Hosoi, Shuichi, to Honda Giken Kogyo K.K. Air-fuel ratio feedback control method for internal combustion engines. 4,926,828, Cl. 123-489.000.
Fujimoto, Takanori; and Hara, Toshirou, to Mitsubishi Denki Kabushiki Kaisha. Ignition signal distributing circuit for engine. 4,926,807, Cl. 123-179.0BG.
Fujimoto, Takanori; and Hara, Toshiro, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for detecting misfire and for controlling fuel injection. 4,928,228, Cl. 364-431.090.
Fujino, Yuuji; and Nakamura, Yasuhiro, to Koito Manufacturing Co., Ltd. Vehicle lamp device. 4,928,215, Cl. 362-61.000.
Fujioka, Yoshiki; and Hirota, Mitsuhiko, to Fanuc Ltd. Power supply regenerating circuit. 4,928,052, Cl. 318-762.000.
Fujisawa, Hiroshi: *See—*
Kise, Masahiro; Yoshimoto, Yoshihiko; Fujisawa, Hiroshi; Sasaki, Yasuo; and Yasufuku, Shoji, 4,927,835, Cl. 514-448.000.
Fujisawa Pharmaceutical Co., Ltd.: *See—*
Takaya, Takao; Sakane, Kazuo; Miyai, Kenzi; and Kawabata, Kohji, 4,927,818, Cl. 514-202.000.
Fujita, Yoshihiro: *See—*
Takase, Haruo; Uenaka, Kazushige; Abe, Akira; and Fujita, Yoshihiro, 4,927,533, Cl. 210-257.100.
Fujitaki, Roy K.: *See—*
Craig, Burnie M.; and Fujitaki, Roy K., 4,926,507, Cl. 4-295.000.
Fujitsu Limited: *See—*
Ebesyu, Hidetaka, 4,928,026, Cl. 307-479.000.
Kokado, Masayuki, 4,928,025, Cl. 307-455.000.
Okuda, Hiroshi, 4,927,471, Cl. 148-33.500.
Shimotsuhama, Isao; Emori, Shinji; Watanabe, Yoshio; and Tamamura, Masaya, 4,928,024, Cl. 307-455.000.
Tanizawa, Tetsu, 4,928,164, Cl. 357-45.000.
Yamauchi, Junichi; Maejima, Kimiko; Eguchi, Kaoru; and Kabuyama, Noriko, 4,928,253, Cl. 364-521.000.
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Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katumi; and Fukumura, Seisuke, 4,927,344, Cl. 425-28.100.
Fukuo, Koichi, to Honda Giken Kogyo Kabushiki Kaisha. Mechanism for switching valve operating modes in an internal combustion engine. 4,926,804, Cl. 123-90.160.
Fuller, Jimmie G. Spinner bait box and storage system. 4,927,016, Cl. 206-315.110.

Fulton, Alfred L., to SCI Systems, Inc. Printer and method. 4,928,133, Cl. 346-150.000.

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Kushibe, Mitsuhiro; Eguchi, Kazuhiro; Funamizu, Masahisa; and Ohba, Yasuo, 4,928,285, Cl. 372-45.000.

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Ataka, Hiroshi; and Furukawa, Yoshimi, 4,926,954, Cl. 180-140.000.

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Morizumi, Mitsuo; Omura, Kinya; Arita, Eriya; Furuya, Katsuji; Yasuda, Sakae; and Kodera, Masaya, 4,926,914, Cl. 141-59.000.

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Sato, Mitsuru; Iizuka, Tetsuya; Furuya, Kiyoshi; Shoji, Norio; and Sekine, Masato, 4,928,074, Cl. 330-254.000.

Furuyama, Masaaki: *See*—
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Futrex, Inc.: *See*—
Rosenthal, Robert D., 4,928,014, Cl. 250-341.000.

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Price, Robert A., 4,927,177, Cl. 280-851.000.

Gabbe, David; and Batchelder, Ned, to Digital Equipment Corporation. Printing apparatus and method for printing a plurality of pages onto a single sheet. 4,928,252, Cl. 364-519.000.

Gac, Frank D.: *See*—
Petrovic, John J.; Carter, David H.; and Gac, Frank D., 4,927,792, Cl. 501-92.000.

GAF Chemicals Corporation: *See*—
Liu, Kou-Chang, 4,927,976, Cl. 568-665.000.
Shih, Jenn S.; Smith, Terry E.; and Login, Robert B., 4,927,667, Cl. 427-154.000.

Gagas, Stanley. Storm infilteration disk with filter. 4,927,163, Cl. 277-23.000.

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Gagnepain, Didier, to Terraillon, societe anonyme. Ergonomic handle for a kitchen article. 4,926,521, Cl. 16-110.00A.

Gailey, Edward D., to Tuthill Corporation. Socket assembly. 4,926,895, Cl. 137-15.000.

Gainey, Michael D. Riding tractor umbrella. 4,927,117, Cl. 248-539.000.

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Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.

Galante, Richard L.: *See*—
Hopkins, William M.; Brightwell, Robert A.; Young, Ray A.; Clark, John K.; Miller, Frederick W.; Galante, Richard L.; Waibel, Terry J.; and Kolowski, Michael A., 4,926,919, Cl. 152-209.00R.

Galbi, David; and Kohn, Les, to Intel Corporation. Sticky bit predictor for floating-point multiplication. 4,928,259, Cl. 364-745.000.

Gale, Edwin J.; Olsen, Albert B.; and Dinsmoor, John C., to Stanley Aviation Corporation. Coupler with combination locking and bonding ring. 4,928,202, Cl. 361-215.000.

Galgana, Thomas. Unitary buoy. 4,927,394, Cl. 441-1.000.

Galiano, Christian: *See*—
Jorion, Bruno; Galiano, Christian; and Wraight, Peter, 4,928,088, Cl. 340-854.000.

Galinski, Edmund V.: *See*—
DiRubbio, Vincent; and Galinski, Edmund V., 4,926,752, Cl. 102-486.000.

Gall, Rudi; and Bosies, Elmar, to Boehringer Mannheim GmbH. Diphosphonate derivatives, pharmaceutical compositions and methods of use. 4,927,814, Cl. 514-108.000.

Gallatin, Gregg M.: *See*—
de Groot, Peter J.; Macomber, Steven H.; and Gallatin, Gregg M., 4,927,263, Cl. 356-5.000.

Gallian, John J.: *See*—
Hatcher, Herbert J.; Gallian, John J.; and Leeper, Stephen A., 4,927,757, Cl. 435-105.000.

Galliani, Giulio; Barzaghi, Fernando; Bonetti, Carla; and Toja, Emilio, to Roussel Uclaf. Derivatives of 3-piperidine carbaldehyde oxime and their use as medicaments. 4,927,837, Cl. 514-331.000.

Galpin Research, Limited Partnership: *See*—
Hayden, William; Hayden, Mark W.; and White, Richard S., 4,927,318, Cl. 414-786.000.

Gandolfi, Luciano: *See*—
Spatrisano, Antonio P.; Gandolfi, Luciano; Minotti, Carlo; and Di Cristina, Natale, 4,926,547, Cl. 29-841.000.

Ganguly, Dipankar; and Giuliani, David, to International Biomedics, Inc. Apparatus and method for non-invasively and automatically measuring the volume of urine in a human bladder. 4,926,871, Cl. 128-660.070.

Garbalizer Machinery Corp.: *See*—
Brewer, John C., 4,927,088, Cl. 241-223.000.

Gardner, James J. Motion transmitting systems for machinery & machine tools. 4,926,709, Cl. 74-424.880.

Gardner, Keith: *See*—
Pettigrew, Robert M.; Humberstone, Victor C.; Gardner, Keith; Longman, Robert J.; and Helfet, Peter R., 4,928,132, Cl. 346-135.100.

Gardner, Owen M.; and Cheek, Ralph L., to Imco Recycling Inc. Treatment of aluminum reduction cell linings combined with use in aluminum scrap reclamation. 4,927,459, Cl. 75-685.000.

Garg, Diwakar; Wrecsics, Ernest L.; Schaffer, Leslie E.; Mueller, Carl F.; Dyer, Paul N.; and Fabregas, Keith R., to Air Products and Chemicals, Inc. High erosion/wear resistant multi-layered coating system. 4,927,713, Cl. 428-627.000.

Garnaud, Marie-Anne: *See*—
Bourjot, Pierre; and Garnaud, Marie-Anne, 4,927,184, Cl. 285-21.000.

Garrett, Jimmy R. Guide for slotting, scoring, trimming or like heads. 4,926,730, Cl. 83-499.000.

Garth, Peter; Simpson, Stuart M.; Parkinson, John E.; and Rogers, Alan H., to Horsell Graphic Industries Limited. Processing of exposed lithographic printing plates by conducting second exposure under water. 4,927,741, Cl. 430-309.000.

Garthwaite, Albert N.: *See*—
Baumann, Gerald W.; Garthwaite, Albert N.; and Hutchings, Carl D., 4,928,147, Cl. 355-288.000.

Gartner, Klaus W.; and Uyeda, Alan K. Self locking electronic lock. 4,926,664, Cl. 70-119.000.

Gas Research Institute: *See*—
Christensen, Richard N.; DeVuono, Anthony C.; Wilkinson, William H.; and Landstrom, D. Karl, 4,926,659, Cl. 62-476.000.
Kardos, Peter, 4,926,798, Cl. 122-24.000.
Pearman, Arthur N. J., 4,926,678, Cl. 73-3.000.

Gasiunas, Donatas V.; and Storace, Anthony, to Pitney Bowes Inc. Hall effect printwheel encoder. 4,928,089, Cl. 340-870.310.

Gassen, James, to Textron Inc. Exhaust configuration. 4,926,637, Cl. 60-317.000.

Gassiat, Alain L., to Carbone Industrie. Disk brake assembly for wheels of land motor vehicles. 4,926,977, Cl. 188-18.00A.

Gates Rubber Company, The: *See*—
Salinas, Philip, 4,926,909, Cl. 138-109.000.

Gattey, Phillip; and Chen, Shu-Ren, to ACS Communications. Hinged acoustical voice tube. 4,926,961, Cl. 181-22.000.

Gatzemeyer, Dwight L.: *See*—
Sorensen, Joseph A.; and Gatzemeyer, Dwight L., 4,926,722, Cl. 81-487.000.

Gaudet, Rolland M. Padlock shield. 4,926,662, Cl. 70-56.000.

Gay, Pierre; and Vatant, Robert, to Clecim. Process and machine for the continuous casting of a thin metal product. 4,926,930, Cl. 164-476.000.

Geary, Philip J.: *See*—
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., 4,927,759, Cl. 435-156.000.

Gebrueder Loepfe AG: *See*—
Weidmann, Erich, 4,927,093, Cl. 242-154.000.

Gee, Stephen K., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,927,453, Cl. 71-92.000.

Geertsma, Geert; Poel, Hendrik; and Weersink, Andreas, to U.S. Philips Corp. Shaving apparatus. 4,926,550, Cl. 30-43.100.

Gelinas, William A.; Holtz, Edwin R.; Argazzi, Dennis J.; Smigel, Robert L.; and Wiley, Dan W., to Loctite Corporation. Apparatus for producing an atmosphere other than ambient. 4,927,487, Cl. 156-351.000.

Gelles, David S.: *See*—
Johnson, Gerald D.; Lobsinger, Ralph J.; Hamilton, Margaret L.; and Gelles, David S., 4,927,468, Cl. 148-3.000.

Gemma, Nobuhiro: *See*—
Egusa, Syun; Miura, Akira; and Gemma, Nobuhiro, 4,927,589, Cl. 264-259.000.

Genbauffe, Francis S.; and Kimmel, Steven A., to Robertshaw Controls Company. Cooking apparatus, door latching construction therefor and methods of making the same. 4,927,996, Cl. 219-413.000.

Genencor, Inc.: *See*—
Arbige, Michael V.; and Silver, Scott C., 4,927,644, Cl. 426-35.000.

General Electric Company: *See*—
Adams, Ronald L.; Kimbel, Kirk L.; and Quinn, Clayton B., 4,927,675, Cl. 428-35.900.
Arthur, Stephen D.; and Temple, Victor A. K., 4,927,772, Cl. 437-6.000.
Brown, Sterling B., 4,927,881, Cl. 525-92.000.
Brown, Sterling B., 4,927,894, Cl. 525-390.000.
Carlson, James R.; and Tobbe, Joseph D., 4,926,523, Cl. 16-125.000.
Davison, Samuel H.; Kast, Kevin H.; and Clark, Aidan W., 4,928,240, Cl. 364-431.020.
Day, Stanley G., 4,928,241, Cl. 364-424.010.
DeRudder, James L.; Savenije, Herman; and Wang, I-Chung W., 4,927,880, Cl. 525-63.000.
Dorri, Bizhan; and Brzozowski, Steven J., 4,926,646, Cl. 62-51.100.
Dorri, Bizhan; and Laskaris, Evangelos T., 4,926,647, Cl. 62-51.100.
Guggenheim, Thomas L.; McCormick, Sharon J.; and Colley, Alice M., 4,927,904, Cl. 528-182.000.
Hitch, Thomas T., 4,927,359, Cl. 432-206.000.
Jacobs, Linda Y.; Palmieri, Joseph M.; and Smith, James I., 4,928,080, Cl. 335-202.000.
Johnson, Ronald M., 4,926,654, Cl. 62-229.000.
Kadambi, Vedanth, 4,928,296, Cl. 378-141.000.
Kim, Jeung T.; and Imam, Imdad, 4,927,342, Cl. 418-63.000.
Kliman, Gerald B.; and Jones, Donald W., 4,927,329, Cl. 416-127.000.

Nerone, Louis R., 4,928,038, Cl. 315-209.00R.
Ortiz, Angel L., Jr.; and Jones, Marshall G., 4,927,224, Cl. 350-96.150.
Ortiz, Angel L., Jr., 4,927,226, Cl. 455-611.000.
Reed, Clive W.; Rzad, Stefan J.; and Devins, John C., 4,927,704, Cl. 428-221.000.
Rosenquist, Niles R., 4,927,914, Cl. 528-480.000.
Skoch, Michael J.; and Hetzel, Frederick, 4,928,032, Cl. 313-318.000.
Stewart, Kevin R., 4,927,910, Cl. 528-371.000.
Stewart, Kevin R., 4,927,911, Cl. 528-371.000.

General Hospital Corporation, The: *See*—
Matsueda, Gary R.; Haber, Edgar; and Hui, Kwan, 4,927,916, Cl. 530-387.000.
Rubin, Robert H.; and Strauss, H. William, 4,926,869, Cl. 128-654.000.

General Instrument Corporation: *See*—
White, Charles M., 4,928,309, Cl. 380-15.000.

General Kinematics Corporation: *See*—
Musschoot, Albert, 4,926,601, Cl. 51-7.000.

General Motors Corporation: *See*—
Abboud, Pierre Y., 4,928,036, Cl. 315-82.000.

Geng, Markus; and Loutan, Dominique, to Georg Fischer AG. Automatic coupling for rail borne vehicles. 4,927,035, Cl. 213-77.000.

Genodman, Yury: *See*—
Solomon, Frank; and Genodmas, Yury, 4,927,514, Cl. 204-290.00R.

Gentile, John R., to Laser Precision Corporation. Signal averaging for optical time domain relectometers. 4,928,232, Cl. 364-525.000.

Georg Fischer AG: *See*—
Geng, Markus; and Loutan, Dominique, 4,927,035, Cl. 213-77.000.
Hanselka, Reinhard, 4,927,999, Cl. 219-535.000.
Kunz, Peter, 4,927,642, Cl. 425-508.000.

Georg Fischer Aktiengesellschaft: *See*—
Steinmetz, Hans-Werner; and Reich, Fritz, 4,927,183, Cl. 285-21.000.

Georg Karl geka-brush GmbH: *See*—
Fitjer, Holger, 4,927,283, Cl. 401-132.000.

Georgia Tech Research Corporation: *See*—
Erbil, Ahmet, 4,927,670, Cl. 427-255.300.

Gerardin, Jean-Pierre, to Electricite De France. Process and device for optically measuring the distance and the velocity of a target. 4,928,152, Cl. 356-5.000.

Gerovac, Branko J.: *See*—
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.

Gesellschaft fur Strahlen: *See*—
Schmidt, Karl-Heinz; and Waidelich, Wilhelm, 4,928,176, Cl. 358-126.000.

Geyer, Harry J.: *See*—
Sharma, Ravinder K.; Geyer, Harry J.; and Mitchell, Douglas G., 4,927,505, Cl. 204-34.500.

Ghebre-Sellassie, Isaac; Gordon, Robert H.; and Khan, Sadath U., to Warner-Lambert Company. Modified release gemfibrozil composition. 4,927,639, Cl. 424-497.000.

Gianantonio, Anacleto: *See*—
Assi, Francesco; Lancini, Giancarlo; and Gianantonio, Anacleto, 4,927,754, Cl. 435-71.000.

Gibson, Ellen S.: *See*—
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.

Gifford, Hanson S., III; Simpson, John B.; and Brown, Peter S., to Devices for Vascular Intervention, Inc. Atherectomy device for severe occlusions. 4,926,858, Cl. 606-159.000.

Gilhousen, Klein S.; and Antonio, Franklin P., to Qualcomm, Inc. Multiplexed address control in a TDM communication system. 4,928,274, Cl. 370-92.000.

Gill, John: *See*—
Barnett, Ronald E.; Dikeman, Roxane; Liao, Shyh-Yuan; Gill, John; and Pantaleone, David P., 4,927,654, Cl. 426-548.000.

Gillen, Sara L.: *See*—
Graham, Gary T.; and Gillen, Sara L., 4,926,962, Cl. 181-150.000.

Giordano, John. Locking radiator cap. 4,927,049, Cl. 220-201.000.

Girard, Joel; and Wattebled, Christian, to Vachette. Power-assisted rotary bolt lock. 4,927,196, Cl. 292-201.000.

Gisi, Ulrich, to Sandoz Ltd. Fungicides. 4,927,823, Cl. 514-237.500.

Giuske, Edward T.: *See*—
Nichol, Thomas W.; Giuske, Edward T.; and Johnson, Arlyn, 4,927,160, Cl. 273-371.000.

Gitlitz, Melvin H.: *See*—
Carson, Chrislyn M.; Copping, Leonard G.; Ehr, Robert J.; Gitlitz, Melvin H.; McNeil, Maynard W.; Street, Peter F. S.; and Liebeschuetz, John W., 4,927,812, Cl. 514-63.000.

Giuliani, David: *See*—
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GKN Technology Limited: *See*—
Spedding, Colin E.; and Pollard, Andrew, 4,927,124, Cl. 267-229.000.

Gladden, Robert H., Jr.: *See*—
Bensel, William H., III; Gladden, Robert H., Jr.; Malluck, John F.; Ross, Robert R.; and Williamson, Andrew H., Jr., 4,927,227, Cl. 350-96.200.

Glandt, Carlos A.; Vinegar, Harold J.; and Prats, Michael, to Shell Oil Company. Method of producing tar sand deposits containing conductive layers. 4,926,941, Cl. 166-248.000.

Glass, Alexander J., to KMS Fusion, Inc. Optical measurement of particle concentration. 4,928,153, Cl. 356-343.000.

Glatz, Peter: *See*—
Stolz, Robert; Mirring, Knut; Hein, Rudolf; Simon, Dieter; Raab, Lothar; and Glatz, Peter, 4,927,276, Cl. 384-572.000.

Glemet, Michel: *See*—
Lottiau, Michel; Glemet, Michel; Cognet, Gilles; and Causier, Alain, 4,927,583, Cl. 264-136.000.

Glen, Stefan J.; and Ellison, William E., to Beckman Instruments, Inc. Spring biased drive socket insert for centrifuge rotors. 4,927,406, Cl. 494-84.000.

Glienke, Peter O., to Wenko-Wenselaar GmbH & Co. KG. Room dehumidifier. 4,927,436, Cl. 55-281.000.

Glinka, Jerome: *See*—
Dolfini, Joseph E.; Glinka, Jerome; and Bosch, Andrew C., 4,927,805, Cl. 512-27.000.

Glover, Richard S., to RSL Industries, Inc. Oil dispensing system with controlled metering and method. 4,927,056, Cl. 222-1.000.

Gluchowski, Charles, to Allergan, Inc. Intraocular pressure reducing 1,11-lactone prostaglandins. 4,927,846, Cl. 514-450.000.

Goble, E. Marlowe; Somers, W. Karl; and McGuire, David. Process of endosteal fixation of a ligament. 4,927,421, Cl. 606-73.000.

Godfroid, Jean-Jacques: *See*—
Pirotzky, Eduardo; Dive, Georges; Godfroid, Jean-Jacques; and Heymans, Francoise, 4,927,825, Cl. 514-255.000.

Golata, John H.; and Woelfel, James A., to Motor Wheel Corporation. Compression mold for fiber-reinforced composite wheels. 4,927,347, Cl. 425-150.000.

Goldsmith, Eric S.: *See*—
Shirley, Thomas F., Jr.; and Goldsmith, Eric S., 4,927,789, Cl. 455-67.000.

Goldstein, Norman P.: *See*—
Impink, Albert J., Jr.; and Goldstein, Norman P., 4,927,593, Cl. 376-254.000.

Golik, Stephen S., to North American Philips Corporation. Corner raster distortion correction circuit. 4,927,219, Cl. 315-371.000.

Gombert, Bernd: *See*—
Dietrich, Johannes; and Gombert, Bernd, 4,926,708, Cl. 74-424.80C.

Gomes, Francis, to Manostat Corporation. Bottle uncapping and recapping machine. 4,926,717, Cl. 81-3.200.

Gomez, Cebers: *See*—
Rodriguez, Domingo; and Gomez, Cebers, 4,927,524, Cl. 208-131.000.

Goodknight, Frank A.: *See*—
Moy, Michael E.; Beavers, Kelly J.; Bray, Stuart W.; Goodknight, Frank A.; Kummli, Paul; Kutasy, Eugene; Lucchesi, Raymond L.; Munro, Frederick G.; Sellke, Richard G.; and Studebaker, Thomas J., 4,928,245, Cl. 364-513.000.

Goodman, Clifford Lawrence: *See*—
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Goodyear Tire & Rubber Company, The: *See*—
Demor, Edward J., III; Hinkel, Walter W.; and Lukich, Lewis T., 4,926,918, Cl. 152-154.000.
Hopkins, William M.; Brightwell, Robert A.; Young, Ray A.; Clark, John K.; Miller, Frederick W.; Galante, Richard L.; Waibel, Terry J.; and Kolowski, Michael A., 4,926,919, Cl. 152-209.00R.

Goosen, Carl C. Disposable anterior lower leg guard. 4,926,501, Cl. 2-22.000.

Gorbics, Mark S.: *See*—
Crawley, H. Bert; Rosenberg, Eli I.; Meyer, W. Thomas; Gorbics, Mark S.; Thomas, William D.; McKay, Roy L.; and Homer, John F., Jr., 4,928,246, Cl. 364-514.000.

Gordon, Bernard M., to Analogic Corporation. X-ray tomography apparatus. 4,928,283, Cl. 378-20.000.

Gordon, Orville. Apparatus and method for the precision evaluation of visual function in the fovea centralis (macula) area of the retina. 4,927,260, Cl. 351-243.000.

Gordon, Robert H.: *See*—
Ghebre-Sellassie, Isaac; Gordon, Robert H.; and Khan, Sadath U., 4,927,639, Cl. 424-497.000.

Gorziglia, Mario: *See*—
Chanock, Robert M.; Kapikian, Albert; Midthun, Karen; Flores, Jorge; Gorziglia, Mario; Hoshino, Yasutaka; and Peres-Schael, Irene, 4,927,628, Cl. 424-89.000.

Gossler, Hans K.; and Roberts, Charles P., to Navistar International Transportation Corp. Pallet box. 4,927,026, Cl. 206-600.000.

Goswami, Ramanuj; and Chen, Chin H., to Eastman Kodak Company. Fluorescent dyes and biological and analytical uses thereof. 4,927,927, Cl. 544-106.000.

Gotoh, Masao; Hira, Yasuo; Waragai, Kenichi; Nakamura, Shozo; and Yokono, Hitoshi, to Hitachi, Ltd. Heat insulating case and process for preparing the same. 4,927,044, Cl. 220-83.000.

Gotting, Georg; and Lammle, Harro, to Grapha-Holding AG. Assembly for adjusting the rolls of punching and like machines. 4,926,666, Cl. 72-247.000.

Gottlieb Roll GmbH & Co.: *See*—
Eylers, Dieter, 4,926,525, Cl. 24-11.00F.

Goulding, Terence, to Imperial Chemical Industries PLC. Surface treatment for recording media. 4,927,716, Cl. 428-695.000.

Gouttebessis, Jacques; and Villaine, Philippe, to Michelin Recherche et Technique S.A. Pneumatic tire-the carcasse of which is formed of a regenerated celluloae fiber. 4,926,920, Cl. 152-548.000.

Goutzoulis, Anastosios P.; and Davies, David K., to Westinghouse Electric Corp. Pseudorandom pulse code generators using electro-optical XOR gates. 4,928,310, Cl. 380-46.000.

Grabbe, Dimitry G.; and Schnoor, William J., to AMP Incorporated. Electrical connector for high density usage. 4,927,369, Cl. 439-66.000.

Grace G.m.b.H.: *See*—
Bohastedt, Werner; and Lindenstruth, Werner, 4,927,722, Cl. 429-147.000.

Graco Inc.: *See*—
Kwok, Kui-Chiu; and Marchand, Bernard J., 4,927,081, Cl. 239-223.000.

Graham, Gary T.; and Gillen, Sara L. Decorative speaker cover. 4,926,962, Cl. 181-150.000.

Graham, Janice C. Portable golf swing training aid. 4,927,152, Cl. 273-186.00R.

Gramondi, Patrick: *See*—
Barlou, Andre ; Beltritti, Alexandre; Gramondi, Patrick; and Vidal, Hugues, 4,927,564, Cl. 252-628.000.

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Gotting, Georg; and Lammle, Harro, 4,926,666, Cl. 72-247.000.
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Daly, John J., 4,927,986, Cl. 178-18.000.

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Foreman, Kenneth M.; and Maciulaitis, Algirdas, 4,928,286, Cl. 372-90.000.

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Asai, Francesco; Lancini, Giancarlo; and Gianantonio, Anacleto, 4,927,754, Cl. 435-71.000.

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Kopatz, Nelson E.; Johnson, Walter A.; and Ritsko, Joseph E., 4,927,456, Cl. 75-346.000.
Shaffer, John W., 4,927,398, Cl. 445-9.000.

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Hilaire, Jean C.; and Guerin, Roland, 4,927,860, Cl. 521-60.000.

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Purrmann, Robert; Guggenberger, Rainer; and Pieper, Gunter, 4,927,866, Cl. 523-115.000.

Guggenheim, Thomas L.; McCormick, Sharon J.; and Colley, Alice M., to General Electric Company. Method for preparing cyclic polyarylate oligomers. 4,927,904, Cl. 528-182.000.

Gulbenkian, Aylin H.: *See*—
Renga, James M.; Pon, Charles K.; Gulbenkian, Aylin H.; and Smith, Michael G., 4,927,508, Cl. 204-79.000.

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Gutter, David H., to AMP Incorporated. Electrical connector shell assembly and module retention clip. 4,927,388, Cl. 439-660.000.

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Alpar, Tibor; Gyorvari, Janos; and Schmidt, Erno , 4,927,573, Cl. 264-40.100.

Gyory, J. Richard: *See*—
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Mathur, Indresh; James, Allan; and Bissett, David, 4,927,509, Cl. 204-83.000.

H. Niemeyer Sohne GmbH & Co. KG: *See*—
Ungruh, Josef; and Rohlmann, Maximilian, 4,926,619, Cl. 56-15.400.

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Madill, E. Gaylord, 4,926,713, Cl. 475-146.000.

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Bell, Weldon K.; and Haag, Werner O., 4,927,924, Cl. 540-536.000.

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Bernhardt, Gunther; Amort, Jurgen; Kragl, Heinz; and Haas, Margret, 4,927,948, Cl. 556-401.000.

Haber, Edgar: *See*—
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Hademenos, Jim P., to Western Atlas International, Inc. Compound linkage-arm assembly for use in bore-hole tools. 4,926,937, Cl. 166-206.000.

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Haga, Shunichi: *See*—
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Hagar, Donald K.; and McIntyre, Robert W., to Eagleair, Inc.; and McIntyre, Robert W. Method and system for controlling the supply of fuel and air to a furnace. 4,927,351, Cl. 431-12.000.

Hagemann, Hermann: *See*—
Adler, Alfons; Widdig, Arno; Kuhle, Engelbert; Fuhrer, Wolfgang; Hagemann, Hermann; and Hansaler, Gerd, 4,927,824, Cl. 514-241.000.

Haggren, Henrik. Method for the three-dimensional surveillance of the object space. 4,928,175, Cl. 358-108.000.

Haines, Eric A.: *See*—
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Haire, Allen; Abele, Alan C.; and Kuczek, Stanley W., to Enerco Technical Products, Inc. Burner assembly. 4,927,355, Cl. 431-329.000.

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Hallenbach, Werner: *See*—
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Hallings, Leonard L.; Bramer, Donald W.; Sanborn, Bruce A.; and Schryver, James E., to MDT Corporation. Lighthead assembly. 4,928,211, Cl. 362-33.000.

Hama, Shinji: *See*—
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Hamala, Sirpa; Heikkila, Matti; Laine, Jouko; Kokkonen, Kari; and Kesakkala, Timo, to Oy Tampella AB. Process for removing a constituent from a hot gas stream by exothermic ionic reaction of the constituent with a reactant provided in fine particulate form. 4,927,613, Cl. 423-244.000.

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Inagaki, Tetsuya; Tagashira, Eijiro; Takaya, Masahiro; and Nishimura, Yasuhiro, 4,927,817, Cl. 514-184.000.

Hamilton, Frank S.; Ourts, Johnny D.; and Mabry, Ray W., to HOM, Inc. Method of reinstating acceptable flavor to off-flavor catfish by treatment with peroxide additives. 4,926,795, Cl. 119-3.000.

Hamilton, Margaret L.: *See*—
Johnson, Gerald D.; Lobsinger, Ralph J.; Hamilton, Margaret L.; and Gelles, David S., 4,927,468, Cl. 148-3.000.

Hamilton Standard Controls, Inc.: *See*—
Mierzwinski, Eugene P., 4,927,490, Cl. 156-634.000.

Hamilton, Thomas W., to T W Hamilton Design Limited. Apparatus for selecting and discharging seeds. 4,926,583, Cl. 47-1.010.

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Muhlratzer, August; Handrick, Karin; Lausmann, Siegfried; and Hirt, Alfred, 4,927,702, Cl. 428-215.000.

Hannewald, Thomas: *See*—
Porth, Wolfgang; Weibler, Wolfgang; Kern, Eckhart; Hannewald, Thomas; and Weingartner, Reiner, 4,926,821, Cl. 123-399.000.

Hanselka, Reinhard, to Georg Fischer AG. Apparatus for fusion joining plastic pipe. 4,927,999, Cl. 219-535.000.

Hansen, Bernd. Process for filling and subsequent fusion welding of receptacles. 4,926,613, Cl. 53-433.000.

Hansen, Loren F.: *See*—
Cozine, Mark L.; Ferguson, David G.; Hansen, Loren F.; and Lamb, Mark E., 4,926,947, Cl. 172-22.000.

Hanson, Carl E. Ornamental ceiling system. 4,926,606, Cl. 52-484.000.

Hanson, Richard A. Proofmass suspension assembly for accelerometers. 4,926,689, Cl. 73-497.000.

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Adler, Alfons; Widdig, Arno; Kuhle, Engelbert; Fuhrer, Wolfgang; Hagemann, Hermann; and Hanssler, Gerd, 4,927,824, Cl. 514-241.000.
Wollweber, Detlef; Kramer, Wolfgang; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 4,927,844, Cl. 514-425.000.

Hanyu, Susumu; Hara, Kazumasa; and Sano, Yasuro, to Janome Sewing Machine Company Limited. Needle hole guide mechanism for zigzag sewing machine. 4,926,770, Cl. 112-453.000.

Hara, Kazumasa: *See*—
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Hara, Masaaki; Nishikawa, Seigo; Tazaki, Taketoshi; and Inokuchi, Hiroshi, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Method for correcting abrasion in a robot having a wearing tool mounted thereon. 4,926,604, Cl. 51-165.880.

Hara, Masanori: *See*—
Sugawara, Sakuo; Hara, Masanori; and Suzuki, Takane, 4,926,839, Cl. 126-96.000.

Hara, Toshiro: *See*—
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Hara, Toshirou: *See*—
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Harazoe, Hirofumi: *See*—
Ohori, Yoshiji; and Harazoe, Hirofumi, 4,927,871, Cl. 524-230.000.

Hardin, George T., to Robertshaw Controls Company. Differential pressure transmitter, a square root extracting device therefor and methods of making the same. 4,926,697, Cl. 73-861.480.

Hardisty, Derek: *See*—
Stapley, Gerald; Tate, Geoffrey; and Hardisty, Derek, 4,926,665, Cl. 70-277.000.

Haring, Petrus G. M., to Lever Brothers Company. Process for the extraction of lactones from lipid material. 4,927,652, Cl. 426-330.600.

Haritonidis, Joseph H.; Senturia, Stephen D.; Warkentin, David J.; and Mehregany, Mehran, to Massachusetts Institute of Technology. Optical micropressure transducer. 4,926,696, Cl. 73-205.000.

Harmon, James E., to Xerox Corporation. Contaminant cleaner. 4,928,149, Cl. 355-305.000.

Harms, Klaus; Schray, Hans-Dieter; Taubitz, Bernd; and Wirtz, Rainer, to Robert Bosch GmbH. Circuit arrangement for operating a multiphase synchronous motor on a direct-voltage system. 4,928,042, Cl. 318-254.000.

Harnisch, Horst; and Raue, Roderich, to Bayer Aktiengesellschaft. Colorless salts of heteropolyacids as charge control substances in toners. 4,927,729, Cl. 430-110.000.

Harrier Inc.: *See*—
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Harrigill, William T.: *See*—
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Harris, Benjamin J. Staging. 4,926,590, Cl. 52-8.000.

Harris Corporation: *See*—
Hsu, Sheng T.; and Flatley, Doris W., 4,927,777, Cl. 437-44.000.

Harris, Don W. Sacrum support device. 4,926,845, Cl. 128-78.000.

Harris, Robert F.: *See*—
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Harrison, Anthony W.; and Taft, Philip A., to Lucas Industries, Public Limited Company. Rotary electric drive device for anti-skid braking system. 4,927,212, Cl. 303-115.000.

Harrison, Daniel J.: *See*—
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Harsanyi, Jozsef; Kohanyi, Laszlo ; Domsa, Karoly; Szakacs, Lajos; Szentgyorgyi, Geza; and Imre, Aladar, to Egis Gyogyszergyar. Lubricant of lubricating oil basis for lubricating rotating and/or sliding surfaces and process for preparing same. 4,927,549, Cl. 252-25.000.

Hart, Richard T., to Varo, Inc. Universal night vision goggle adapter. 4,927,237, Cl. 350-319.000.

Hartlage, Robert P.: *See*—
Cheng, David; Hartlage, Robert P.; and Zhang, Wesley W., 4,927,485, Cl. 156-345.000.

Hartley, Craig J.: *See*—
Rabinovitz, Raphael S.; and Hartley, Craig J., 4,926,875, Cl. 128-691.000.

Hartman, Stuart J.: *See*—
Johnson, Grannis S.; Grinstein, Reuben H.; Hartman, Stuart J.; and Dallago, Raymond P., 4,927,902, Cl. 528-99.000.

Hartvig Jensen & Co. A/S: *See*—
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Hartwell, George E.: *See*—
Molzahn, David C.; Hartwell, George E.; and Bowman, Robert G., 4,927,931, Cl. 544-357.000.

Harward, Charles N., to Philip Morris Incorporated. Methods and apparatus for optically enhancing selected features in an input image. 4,928,181, Cl. 358-230.000.

Hasebe, Nobuhisa: *See*—
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Hasegawa, Jun: *See*—
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Hasegawa, Mitsuhiro: *See*—
Tamura, Haruhisa; Yamasaki, Takahiko; and Hasegawa, Mitsuhiro, 4,927,998, Cl. 219-494.000.

Hasegawa, Tai; Monnai, Jun; and Matsuzaki, Masatoshi, to Konishiroku Photo Industry Co., Ltd. Platen for thermal transfer printer. 4,928,134, Cl. 346-76.0PH.

Hasha, Brian B.; Hasha, Malvern M.; and Hasha, Bruce B. Method and apparatus for externally and internally testing for leaks in connections between tubular members. 4,926,680, Cl. 73-46.000.

Hasha, Bruce B.: *See*—
Hasha, Brian B.; Hasha, Malvern M.; and Hasha, Bruce B., 4,926,680, Cl. 73-46.000.

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Hashimoto, Hikotaka; and Kobayashi, Kunio, to Kikkoman Corporation. Apparatus for manufacturing soy sauce. 4,926,747, Cl. 99-486.000.

Hashimoto, Hiroshi; and Yamanaka, Hiromichi, to Canon Kabushiki Kaisha. Sheet stacking apparatus. 4,927,131, Cl. 271-215.000.

Hass, Rudi; Jansen, Georg; and Kallen, Wilhelm, to Eisengiesserei Monforts GmbH & Co. Cast-iron element. 4,927,688, Cl. 428-34.600.

Hass, Wolfgang: *See*—
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Hata, Kazuo: *See*—
Osaka, Shigemi; Hata, Kazuo; and Takahashi, Tsukasa, 4,927,560, Cl. 252-315.100.

Hata, Yoshiaki: *See*—
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,928,124, Cl. 354-106.000.

Hatcher, Herbert J.; Gallian, John J.; and Leeper, Stephen A., to Idaho Research Foundation, Inc. Production of substantially pure fructose. 4,927,757, Cl. 435-105.000.

Hatta, Yoshihiko, to Minolta Camera Kabushiki Kaisha. Copy apparatus having plural copy sheet discharge trays for different sized copy sheets. 4,928,150, Cl. 355-311.000.

Hattori, Shigenori: *See*—
Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, 4,927,278, Cl. 400-208.000.

Haupt, Eugene J., to Allegretti & Company. Semi-automatic string trimmer head. 4,926,557, Cl. 30-276.000.

Hauser, Hermann. Holder for rotary material removing tools. 4,927,304, Cl. 409-231.000.

Haushalter, Frederick W., to Robinson Fin Machines, Inc. Compressed fin heat sink. 4,926,935, Cl. 165-185.000.

Hawkins, George W.: *See*—
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Hayakawa, Futomi; and Onoda, Kazuo, to Kabushiki Kaisha Hybec. Linear lamp unit with contacts at both ends. 4,928,210, Cl. 362-217.000.
Hayano, Fusakazu: *See*—
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Hayasaka, Kenichi, to Sanshin Kogyo Kabushiki Kaisha. Fixing structure for bellows of marine propulsion device. 4,927,393, Cl. 440-112.000.
Hayashi, Hiroyuki: *See*—
Sakimori, Hideharu; Ihara, Susumu; and Hayashi, Hiroyuki, 4,927,314, Cl. 414-416.000.
Hayashi, Keiji: *See*—
Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, 4,927,959, Cl. 560-193.000.
Hayashi, Tetsuaki: *See*—
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Hayden, Mark W.: *See*—
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Haydo, Donald H.: *See*—
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Hayes, Cecil: *See*—
Snowball, Malcolm R.; and Hayes, Cecil, 4,927,060, Cl. 222-146.500.
Hayes, Harry: *See*—
Nimmey, Alan; and Hayes, Harry, 4,927,058, Cl. 222-106.000.
Hayman, Andrew J.: *See*—
Kimball, Christopher V.; Stanke, Fred E.; Randall, Curtis J.; and Hayman, Andrew J., 4,928,269, Cl. 367-35.000.
Hayman, Richard: *See*—
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Hays, Byron G., to BASF Corp. Transparent, high strength organic pigments and process for making same. 4,927,466, Cl. 106-494.000.
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Heibel, Michael D.; Impink, Albert J., Jr.; and Grobmyer, Louis R., to Westinghouse Electric Corp. Thermocouple based control rod position indication system. 4,927,594, Cl. 376-258.000.
Heidtmann, Denis L.; and Blouke, Morley M., to Tektronix, Inc. Charge-coupled device for detecting spatial variation in the intensity of electromagnetic radiation. 4,928,003, Cl. 250-211.00J.
Heikkila, Matti: *See*—
Hamala, Sirpa; Heikkila, Matti; Laine, Jouko; Kokkonen, Kari; and Kenakkala, Timo, 4,927,613, Cl. 423-244.000.
Heim, Philippe; and Riess, Gerard, to Norsolor. Process for the manufacture of an impact-resistant thermoplastic resin. 4,927,867, Cl. 523-339.000.
Hein, Rudolf: *See*—
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Heinemann, Joachim; Spies, Karl-Heinz; Keller, Frank; Beicht, Bernd; Leitermann, Wulf; and Lechler, Rolf, to Carl Freudenberg, Firma; and Audi AG, Firma. Louver. 4,926,921, Cl. 160-115.000.
Heinen, Irving J. Valve control mechanism. 4,927,113, Cl. 251-165.000.
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Heitmann, Uwe: *See*—
Lorenzen, Heinz-Christen; Heitmann, Uwe; Siems, Wolfgang; and Piack, Peter, 4,926,886, Cl. 131-84.400.
Helfenstein, Jim, to Williams Controls, Inc. Manually operated air valve and actuator in combination control a hydraulic spool valve for maneuvering heavy equipment. 4,926,905, Cl. 137-625.600.
Helfet, Peter R.: *See*—
Pettigrew, Robert M.; Humberstone, Victor C.; Gardner, Keith; Longman, Robert J.; and Helfet, Peter R., 4,928,132, Cl. 346-135.100.
Helgesson, Bernt, to Akab of Sweden AB. Device for aligning and cutting a web. 4,926,725, Cl. 83-155.000.
Helkey, Roger J.: *See*—
Ashjaee, Javad; Helkey, Roger J.; Lorenz, Robert G.; and Sutherland, Robert A., 4,928,106, Cl. 342-352.000.
Hellquist, Ivan; and Muhlmann, Carl P. M., to Interspiro AB. Respirator. 4,926,855, Cl. 128-201.280.
Hemm, Gerhard; Clausing, Gerhard; and Pietzsch, Heiko, to Jacobs Suchard AB. Package having a tear-open strip. 4,927,028, Cl. 206-618.000.
Hemmerich, Louis; and Strait, Ronald. Gas and oil truck tank mounting strap replacement kit. 4,927,066, Cl. 224-42.45R.
Hemox, Inc.: *See*—
Simpson, James L., 4,927,076, Cl. 229-132.000.
Hendricks, Ross D., to Excellon Automation. Adjustable component cover plate for vibrating conveyor. 4,927,001, Cl. 198-463.500.
Henkel Corporation: *See*—
Johnson, Grannis S.; Grinstein, Reuben H.; Hartman, Stuart J.; and Dallago, Raymond P., 4,927,902, Cl. 528-99.000.
Henkel Kommanditgesellschaft auf Aktien: *See*—
Fiedler, Juergen; Stoeffler, Albert; and Bergmann, Michael, 4,927,059, Cl. 222-136.000.
Schrader, Dieter; and Neuhaus, Winifried, 4,927,627, Cl. 424-62.000.
Wuest, Willi; Eskuchen, Rainer; Esser, Herbert; and Leischner, Hasso, 4,927,946, Cl. 549-371.000.
Henkels, Walter H.: *See*—
Dhong, Sang H.; Lu, Nicky C.; and Henkels, Walter H., 4,927,779, Cl. 428-52.000.
Henne, Heinrich; Dammertz, Karl-Heinz; Schneider, Lutz T.; and Blaszcyk, Gotthard, to Krupp Polysius AG. Grinding process and apparatus. 4,927,086, Cl. 241-80.000.
Henricson, Kaj O.; Repo, Erkki T.; and Ronkonharju, Hannu U., to A. Ahlstrom Corporation. Method and apparatus for separating knots. 4,927,529, Cl. 209-270.000.
Henriksson, Bengt-Ake, to ABU Garcia Produktion AB. Open-face fishing reel of the fixed-spool type. 4,927,094, Cl. 242-242.000.
Henzel, Richard P.; and Zengerle, Paul L., to Eastman Kodak Company. Photographic element having solid particle dispersion oxidized developer scavenger. 4,927,744, Cl. 430-566.000.
Hepburn, Michael J. Self-stabilizing floating cooler. 4,927,041, Cl. 220-20.000.
Heppke, Gerd: *See*—
Bahr, Christian; Heppke, Gerd; Lotzsch, Detlef; Dubal, Hans-Rolf; Escher, Claus; and Ohlendorf, Dieter, 4,927,244, Cl. 350-350.00S.
Herail, Norbert: *See*—
Devaux, Francois; Herail, Norbert; Lefevre, Denis; and Lehuede, Jean-Pierre, 4,928,077, Cl. 333-111.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., to Mobil Oil Corporation. Multiple feed point catalytic cracking process using elutriable catalyst mixture. 4,927,522, Cl. 208-120.000.
Hercules Incorporated: *See*—
Walkden, Stephen A., 4,927,496, Cl. 162-136.000.
Heritage, Jonathan P.; and Weiner, Andrew M., to Bell Communications Research, Inc. Optical systems and methods based upon temporal stretching, modulation and recompression of ultrashort pulses. 4,928,316, Cl. 455-600.000.
Hermann Berstorff Maschinenbau GmbH: *See*—
Capelle, Gerd, 4,927,482, Cl. 156-243.000.
Hermes Electronics Limited: *See*—
Armstrong, Bruce A.; and Dunn, Robert G., 4,928,263, Cl. 367-118.000.
Herran, Vincent W.; and Wofford, George D., to W. R. Grace & Co.-Conn. Flexible stretch/shrink film. 4,927,708, Cl. 428-332.000.
Herrin, Danny R. Step/extension ladder. 4,926,964, Cl. 182-22.000.
Herrington, Fox J., to Mobil Oil Corp. Water bath film cooling apparatus and method. 4,927,574, Cl. 264-40.600.
Herve, Philippe, to Universite Paris X - Nanterre. Method and apparatus for optically measuring, without contact, the granulometry of a cloud of particles or the roughness of a surface. 4,927,267, Cl. 356-336.000.
Herzner, Frederick C.: *See*—
Nash, Dudley O.; and Herzner, Frederick C., 4,926,633, Cl. 60-226.100.
Heslop, Christopher: *See*—
Welbourn, Anthony; and Heslop, Christopher, 4,927,774, Cl. 437-31.000.
Hess, Robert, to Progressive Angioplasty Systems, Inc. Catheter for balloon angioplasty. 4,927,413, Cl. 604-95.000.
Hesselink, Lambertus; and Redfield, Steve R., to Microelectronic & Computer Technology Corp. System and method for photorefractive holographic recording and signal processing. 4,927,220, Cl. 350-3.640.
Hetherington, Richard: *See*—
D'Angelo, Philip J.; Hetherington, Richard; and Rogan, Joseph J., 4,927,796, Cl. 502-62.000.
Hetrick, Homer S. Cover for smoking accessory. 4,926,573, Cl. 40-663.000.
Hettinger, William P., Jr.: *See*—
Ward, Clifford; Chao, Eugene; Booth, Roy E.; Turrill, Frank H.; Wombles, Robert H.; Newman, John W.; and Hettinger, William P., Jr., 4,927,620, Cl. 423-447.200.
Hetz, Helmar: *See*—
Breitenbach, Otto; Hetz, Helmar; Rous, Friedemann; and Ottenreuther, Josef, 4,927,570, Cl. 264-1.400.
Hetzel, Frederick: *See*—
Stoch, Michael J.; and Hetzel, Frederick, 4,928,032, Cl. 313-318.000.
Hewlett-Packard Company: *See*—
Baum, Allen; Bryg, William R.; Mahon, Michael J.; Lee, Ruby B.; and Muchnick, Steven S., 4,928,239, Cl. 364-200.000.
Brock-Fisher, George A.; Kranz, Paul R.; Mniece, James R.; Thiele, Karl E.; Savord, Bernard J.; and Smith, Richard B., 4,926,872, Cl. 128-661.010.
Frankenreiter, Michael, 4,926,873, Cl. 128-681.000.
Greenberg, Donald P.; Cohen, Michael F.; and Haines, Eric A., 4,928,250, Cl. 364-518.000.

Hunt, Barry F.; D'Sa, Alwyn P.; and Magnin, Paul A., 4,928,231, Cl. 364-518.000.
Marzalek, Michael S.; Peterson, Stephen R.; and Wendler, John A., 4,928,251, Cl. 364-484.000.
Rahman, Abdul W. B. A., 4,928,093, Cl. 340-709.000.
Heymans, Francoise: *See*—
Pirotzky, Eduardo; Dive, Georges; Godfroid, Jean-Jacques; and Heymans, Francoise, 4,927,825, Cl. 514-255.000.
Hickey, Pieter John A.; and Claassen, Cornelius J., to Aztec Sensible Cooling, Inc. Integrated wet bulb depression air cooler. 4,926,656, Cl. 62-310.000.
Hickok, William K.; Riley, John M.; and Kosarko, Gerald J., to Eastman Kodak Company. Magnetic recording device using circumferentially offset heads with double sided media. 4,928,196, Cl. 360-105.000.
Higashi, Yuichirou, to Ricoh Company, Ltd. Fixing device selectively operable in color or black/white coping mode. 4,928,148, Cl. 355-290.000.
Higemitsu, Yasuo: *See*—
Rokutanda, Shuji; Higemitsu, Yasuo; Tsuchida, Akiyoshi; and Yamakoshi, Yukihiro, 4,927,734, Cl. 430-264.000.
Higuchi, Hisayuki; Homma, Noriyuki; Suzuki, Makoto; and Tachibana, Suguru, to Hitachi, Ltd. Semiconductor integrated circuit. 4,928,265, Cl. 365-189.010.
Higuchi, Mitsuhiro; and Yamamoto, Hirofumi, to Toto Ltd. Toilet seat structure capable of automatically feeding a seat covering paper onto a toilet seat. 4,926,504, Cl. 4-247.000.
Higuchi, Mitsuhiro; Yamamoto, Hirofumi; Yamamoto, Osamu; Fujii, Shokichi; and Nonomura, Katsumi, to Toto Ltd. Toilet seat structure capable of automatically feeding seat covering paper on toilet seat. 4,926,505, Cl. 4-247.000.
Hijikata, Kenji: *See*—
Nakane, Toshio; Hijikata, Kenji; Kageyama, Yukihiko; and Takahashi, Katsuhiko, 4,927,895, Cl. 525-438.000.
Hijiya, Hiromi; and Miyake, Toshio, to 501 Kabushiki Kaisha Hayashibara Kagaku Kenkyujo. Association complex comprising pullulan and polyethylene glycol and preparation and uses of the same. 4,927,636, Cl. 424-409.000.
Hilaire, Jean C.; and Guerin, Roland, to Atochem. Polyamide powder formed by particles having a gypsum rose structure and process for preparing such powder. 4,927,860, Cl. 521-60.000.
Hill, Amel. Acoustic transducer. 4,928,312, Cl. 381-192.000.
Hill, James B. Press brake. 4,926,671, Cl. 72-389.000.
Hill, Peter F., to British Aerospace Public Limited Company. Surface mounting leadless components on conductor pattern supporting substrates. 4,927,697, Cl. 428-198.000.
Hill, Robert: *See*—
Pitt, Gilles D.; Jones, Roger E.; Antell, George R.; Spicer, Lyndon R.; Barnett, John A.; and Hill, Robert, 4,928,319, Cl. 455-612.000.
Hill, Thomas F., Jr.: *See*—
Repman, Joseph F.; Morris, Thomas E.; and Hill, Thomas F., Jr., 4,927,621, Cl. 423-488.000.
Hillock, Bart A. Fluid vibration damper for racquet. 4,927,143, Cl. 273-73.00D.
Hinkel, Walter W.: *See*—
Demor, Edward J., III; Hinkel, Walter W.; and Lukich, Lewis T., 4,926,918, Cl. 152-154.000.
Hinkle, Allen J. Method of selecting medication and medical equipment. 4,926,885, Cl. 128-898.000.
Hipwell, William E. H., to Eastman Kodak Company. Control of visual display units. 4,928,178, Cl. 358-160.000.
Hira, Yasuo: *See*—
Gotoh, Masao; Hira, Yasuo; Waragai, Kenichi; Nakamura, Shozo; and Yokono, Hitoshi, 4,927,044, Cl. 220-83.000.
Hirai, Masaru: *See*—
Hisamoto, Iwao; Hirai, Masaru; and Ishikawa, Sueyoshi, 4,927,950, Cl. 556-419.000.
Hiramitsu, Tetsushi: *See*—
Inui, Shuji; Hiramitsu, Tetsushi; Takahaski, Toshinori; Tamaki, Makoto; Kikuta, Mitsuhiro; and Mizutani, Junichi, 4,927,364, Cl. 439-15.000.
Hirano, Sadayuki; Murano, Katsuaki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, to Suzuki Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Method of controlling continuously variable transmission system. 4,926,716, Cl. 74-866.000.
Hiraoka, Saburo; Hama, Shinji; and Senga, Mitsuo, to Mitsubishi Rayon Company, Ltd. Process for producing antistatic polymeric material. 4,927,915, Cl. 528-490.000.
Hirashima, Yutaka: *See*—
Isozaki, Kei; Hirashima, Yutaka; and Imamura, Yasuo, 4,927,791, Cl. 501-87.000.
Hirono, Tomohide: *See*—
Naka, Hiroyuki; Hiroso, Tomohide; Suzuki, Naoki; and Ichiyanagi, Takashi, 4,927,068, Cl. 228-103.000.
Hirose, Naoki; Inujima, Takashi; and Takayama, Toru, to Semiconductor Energy Laboratory Co., Ltd. Microwave plasma apparatus employing helmholtz coils and ioffe bars. 4,926,791, Cl. 118-723.000.
Hirota, Mitsuhiko: *See*—
Fujioka, Yoshiki; and Hirota, Mitsuhiko, 4,928,052, Cl. 318-762.000.
Hirsch, Albrecht; and Fleischer, Erwin, to Neynaber Chemie GmbH. Process for the production of basic soaps of divalent metals in powder form. 4,927,548, Cl. 252-17.000.
Hirsch, Gerald P.: *See*—
Bayless, Robert K.; and Hirsch, Gerald P., 4,927,850, Cl. 514-458.000.
Hirt, Alfred: *See*—
Muhlratzer, August; Handrick, Karin; Lassmann, Siegfried; and Hirt, Alfred, 4,927,702, Cl. 428-215.000.
Hirt, Manfred; and Arndt, Heinrich, to Zahnraderfabrik Renk AG. Planetary gear train. 4,926,715, Cl. 475-337.000.
Hirukawa, Itsushi: *See*—
Kudoh, Noboru; Hirukawa, Itsushi; Aoki, Satoshi; Yoshimura, Tsuyoshi; and Shiozawa, Shigeki, 4,927,390, Cl. 440-88.000.
Hisamoto, Iwao; Hirai, Masaru; and Ishikawa, Sueyoshi, to Daikin Industries, Ltd. Fluorine-containing silane compounds. 4,927,950, Cl. 556-419.000.
Hisanaga, Yorisato: *See*—
Kagiya, Tsutomu; Abe, Mitsuyuki; Nishimoto, Seiichi; Shibamoto, Yuta; Shimokawa, Kazuhiro; Hisanaga, Yorisato; Nakada, Tatsuo; and Yoshizawa, Toru, 4,927,941, Cl. 548-264.800.
Hitachi Automotive Engineering Co., Ltd.: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.
Hitachi Chemical Company, Ltd.: *See*—
Era, Susumu; Kobayashi, Setsuo; and Mukoh, Akio, 4,927,735, Cl. 430-270.000.
Hitachi Engineering Co., Ltd.: *See*—
Kuroda, Hiroshi; and Watanabe, Atsushi, 4,928,107, Cl. 342-357.000.
Hitachi, Ltd.: *See*—
Gotoh, Masao; Hira, Yasuo; Waragai, Kenichi; Nakamura, Shozo; and Yokono, Hitoshi, 4,927,044, Cl. 220-83.000.
Hakuta, Shinsaku; Yasaka, Yasuhiro; Nagura, Osamu; Tsuji, Eiji; Suzuki, Makoto; and Akagawa, Hirotaka, 4,926,541, Cl. 29-598.000.
Higuchi, Hisayuki; Homma, Noriyuki; Suzuki, Makoto; and Tachibana, Suguru, 4,928,265, Cl. 365-189.010.
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.
Iwai, Kazumi; Koizumi, Hiromi; and Wada, Katsuo, 4,926,645, Cl. 60-723.000.
Kaku, Nobuyuki; Shigemura, Tatsuya; Uesugi, Masaki; Kano, Kiyoshi; and Ogiro, Kenji, 4,928,191, Cl. 360-85.000.
Kamada, Eiki; Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; and Inoue, Kiyoshi, 4,928,226, Cl. 364-200.000.
Kawabata, Kenji; Ogawa, Soichiro; and Masaki, Ryoichi, 4,928,037, Cl. 315-127.000.
Kobayashi, Masaharu; and Nishimura, Yukio, 4,928,185, Cl. 360-19.100.
Kuroda, Hiroshi; and Watanabe, Atsushi, 4,928,107, Cl. 342-357.000.
Kurosawa, Hinoko; Itoh, Kazuya; Nakamura, Hisashi; and Ishihara, Masamichi, 4,928,281, Cl. 371-51.100.
Nishino, Yoshitaka; Sawa, Toshio; Ohsumi, Katsumi; and Itow, Hisao, 4,927,598, Cl. 376-306.000.
Hitachi Video Engineering, Ltd.: *See*—
Kobayashi, Masaharu; and Nishimura, Yukio, 4,928,185, Cl. 360-19.100.
Hitch, Thomas T., to General Electric Company. Fluid distribution apparatus. 4,927,359, Cl. 432-206.000.
Hix, Charles J., Jr.: *See*—
Baker, David J.; Dubuque, Kenneth J.; Estep, John M.; and Hix, Charles J., Jr., 4,927,114, Cl. 251-240.000.
Ho, Thoi H.: *See*—
Ogoe, Samuel A.; and Ho, Thoi H., 4,927,870, Cl. 524-140.000.
Hobluigie, Audio; Barnabe, Jean-Pierre; and Mouhot, Frederic, to ECIA - Equipements et Composants Pour L'Industrie Automobile. Rapid connection between two shafts or the like. 4,927,286, Cl. 403-322.000.
Hock, Allan G.; Larson, John R.; and Sousa, John G., to Howtek, Inc. Ink curing apparatus. 4,928,112, Cl. 346-25.000.
Hoda, Takeo: *See*—
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,928,124, Cl. 354-106.000.
Hodges, William L.; and Cheek, Patrick J., to Preco Industries, Inc. Method and system for printing graphics and text from vector-based computer aided source information. 4,928,243, Cl. 364-519.000.
Hoechst Aktiengesellschaft: *See*—
Bahr, Christian; Heppke, Gerd; Lotzsch, Detlef; Dubal, Hans-Rolf; Escher, Claus; and Ohlendorf, Dieter, 4,927,244, Cl. 350-350.00S.
Merrem, Hans-Joachim; Buhr, Gerhard; and Lenz, Ruediger, 4,927,732, Cl. 430-191.000.
van der Hoeven, Johannes C. W., 4,927,572, Cl. 264-22.000.
Hoechst Celanese Corporation: *See*—
Mueller, Werner H.; and Khanna, Dinesh N., 4,927,736, Cl. 430-275.000.
Vicari, Richard; Aslam, Mohammad; Ray, Wilson B.; Davenport, Kenneth G.; Dammel, Ralph; Lingnau, Juergen; and Doessel, Karl-Friedrich, 4,927,956, Cl. 560-130.000.
Wadhwa, Lachhman; Bitritto, Michel; and Powers, Edward J., 4,927,909, Cl. 528-331.000.
Walls, John E.; Tellechea, Carlos; and Dhillon, Major S., 4,927,737, Cl. 430-278.000.
Hoechst Roussel Pharmaceuticals Inc.: *See*—
Shutske, Gregory M.; and Kapples, Kevin J., 4,927,820, Cl. 514-229.500.

Hoffman, Frank. Precision vise. 4,927,126, Cl. 269-60.000.
Hoffman-La Roche Inc.: *See*—
Guthrie, Robert W.; Kierstead, Richard W.; and Tilley, Jefferson W., 4,927,826, Cl. 514-256.000.
Guthrie, Robert W.; Kierstead, Richard W.; Mullin, John G.; and Tilley, Jefferson W., 4,927,838, Cl. 514-337.000.
Hoffmann, Henning: *See*—
Putz, Heinrich; Nowitzki, Friedhelm; Damm, Gunter; Bathelt, Hartmut; Kromer, Gunter; Hoffmann, Henning; and Pischke, Reiner, 4,926,634, Cl. 60-274.000.
Hoffmann-La Roche Inc.: *See*—
Fischli, Albert; Gutknecht, Eva-Maria; and Obrecht, Daniel, 4,927,958, Cl. 560-53.000.
Hoisington, Paul A.: *See*—
Spehrley, Charles W., Jr.; Barsa, Steven H.; Tomaszewski, David G.; and Hoisington, Paul A., 4,928,120, Cl. 346-140.00R.
Holbrook, Gerald L.: *See*—
Mehta, Hemang S.; Holbrook, Gerald L.; and Leising, Maurice B., 4,928,235, Cl. 364-424.100.
Holden, John A. Steerable power drive for gantry crane. 4,927,034, Cl. 212-218.000.
Holland, Orin W.: *See*—
Alvis, John R.; Pfiester, James R.; and Holland, Orin W., 4,928,156, Cl. 357-23.400.
Holloway, Brian R.; Howe, Ralph; Rao, Balbir S.; and Stribling, Donald, to Imperial Chemical Industries PLC. Amide derivatives. 4,927,836, Cl. 514-620.000.
Holm-Kennedy, James W.; and McArthur, Scot P., to Research Corporation of the University of Hawaii, The. Viscosity sensor. 4,926,682, Cl. 73-54.000.
Holm-Kennedy, James W.; Kawamoto, Eric H.; and Bopp, Thomas T., to Research Corporation of the University of Hawaii, The. Contactless actuator piston proximity sensor. 4,926,693, Cl. 73-597.000.
Holmes, Gordon W., to Professional Packaging Limited. Medication timing device. 4,926,572, Cl. 40-448.000.
Holtz, Edwin R.: *See*—
Gelinas, William A.; Holtz, Edwin R.; Argazzi, Dennis J.; Smigel, Robert L.; and Wiley, Dan W., 4,927,487, Cl. 156-351.000.
HOM, Inc.: *See*—
Hamilton, Frank S.; Ouzts, Johnny D.; and Mabry, Ray W., 4,926,795, Cl. 119-3.000.
Hom, K.: *See*—
Oppenheim, A. K.; Stewart, H. E.; and Hom, K., 4,926,818, Cl. 123-297.000.
Homa, Daniel: *See*—
Van Brunt, Nicholas; Robertson, Jeffrey C.; and Homa, Daniel, 4,927,013, Cl. 206-221.000.
Hombu, Mitsuyuki: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.
Homer, John F., Jr.: *See*—
Crawley, H. Bert; Rosenberg, Eli I.; Meyer, W. Thomas; Gorbics, Mark S.; Thomas, William D.; McKay, Roy L.; and Homer, John F., Jr., 4,928,246, Cl. 364-514.000.
Homma, Katsuhisa: *See*—
Kimura, Sakae; Nikaido, Masaru; Yanagibashi, Katumi; Homma, Katsuhisa; and Ouchi, Yoshiaki, 4,928,034, Cl. 313-346.00R.
Homma, Noriyuki: *See*—
Higuchi, Hisayuki; Homma, Noriyuki; Suzuki, Makoto; and Tachibana, Suguru, 4,928,265, Cl. 365-189.010.
Honda Giken Kogyo Kabashiki Kaisha: *See*—
Matsubara, Toshihiko; and Kitayama, Taku, 4,927,707, Cl. 428-323.000.
Honda Giken Kogyo K.K.: *See*—
Fujimoto, Sachito; and Hosoi, Shuichi, 4,926,828, Cl. 123-489.000.
Kato, Akira; and Yano, Toru, 4,926,827, Cl. 123-489.000.
Honda Giken Kogyo K.K. (Honda Motor Co., Ltd. in English): *See*—
Ohtaka, Shoichi; and Igarashi, Hisashi, 4,926,825, Cl. 123-489.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Ataka, Hiroshi; and Furukawa, Yoshimi, 4,926,954, Cl. 180-140.000.
Fukuo, Koichi, 4,926,804, Cl. 123-90.160.
Kishi, Noriyuki; Katoh, Atsushi; and Saita, Tomohisa, 4,926,823, Cl. 123-432.000.
Motozawa, Yasuki, 4,927,172, Cl. 280-734.000.
Shibata, Katsuhiro; Azuma, Yuichi; Inoue, Masao; and Okumura, Shinichiro, 4,926,978, Cl. 188-73.100.
Tamura, Mitsunobu; Tsuchihashi, Toshifumi; and Kenmochi, Toshihisa, 4,927,358, Cl. 432-204.000.
Yano, Shunji, 4,927,325, Cl. 415-161.000.
Yoshioka, Hiroshi; Nagatsuma, Nobuyoshi; and Kobayashi, Shinobu, 4,926,972, Cl. 184-109.000.
Honda, Iwakazu, to Sharp Kabushiki Kaisha. Printing apparatus. 4,928,129, Cl. 346-160.000.
Honda Motor Co., Ltd.: *See*—
Kazuo, Inoue; Noriyuki, Kishi; Masao, Kubodera; Eitetsu, Akiyama; Shigeto, Kashiwabara; and Osamu, Takizawa, 4,926,640, Cl. 60-602.000.
Honeywell Inc.: *See*—
Allen, Terry S.; and Wolke, Patrick J., 4,927,097, Cl. 244-118.100.
Van Sloun, Peter H., 4,926,750, Cl. 102-261.000.
Honjo, Makoto: *See*—
Suzuki, Fumio; Akasaka, Nobuhiro; and Honjo, Makoto, 4,927,585, Cl. 264-171.000.
Honjo, Seiichiro; Yamada, Kazuo; Fuchigami, Yasuhiro; and Mizusugi, Tetsuya, to Nippon Sheet Glass Company, Ltd. Apparatus for manufacturing curved glass sheets. 4,927,443, Cl. 65-273.000.
Honma, Mikio, to Ohi Seisakusho Co., Ltd. One-way transmission device. 4,926,987, Cl. 192-8.00C.
Hooper, Paul S.: *See*—
Sevrain, Christophe Jean-Paul; Schramm, Heather R.; Schmidt, Daniel G.; Hooper, Paul S.; and Thomas, Mary P., 4,926,879, Cl. 128-798.000.
Hopkins, John R.; Manning, Randy M.; and Marusak, Stephen A., to AMP Incorporated. Select solder slot termination method. 4,926,548, Cl. 29-860.000.
Hopkins, William M.; Brightwell, Robert A.; Young, Ray A.; Clark, John K.; Miller, Frederick W.; Galante, Richard L.; Waibel, Terry J.; and Kolowski, Michael A., to Goodyear Tire & Rubber Company, The. Vehicle tire with rib type tread pattern having sipes across the ribs. 4,926,919, Cl. 152-209.00R.
Hoppe, Richard J.: *See*—
Walton, Derek N.; and Hoppe, Richard J., 4,928,138, Cl. 363-40.000.
Horbatt, Kenneth: *See*—
Saxon, Ronald L.; Zeger, Leroy; and Horbatt, Kenneth, 4,927,765, Cl. 436-43.000.
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Kaufmann, John W.; Swidwa, Kenneth J.; and Hornak, Leonard P., 4,927,595, Cl. 376-268.000.
Hornbaker, Edwin D.: *See*—
Blocker, Wesley C.; Roark, David N.; and Hornbaker, Edwin D., 4,927,896, Cl. 526-93.000.
Horsell Graphic Industries Limited: *See*—
Garth, Peter; Simpson, Stuart M.; Parkinson, John E.; and Rogers, Alan H., 4,927,741, Cl. 430-309.000.
Horton, Bruce J.: *See*—
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Chanock, Robert M.; Kapikian, Albert; Midthun, Karen; Flores, Jorge; Gorziglia, Mario; Hoshino, Yasutaka; and Peres-Schael, Irene, 4,927,628, Cl. 424-89.000.
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Hosoi, Shuichi: *See*—
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Feder, Joseph; Howard, Susan C.; Wittwer, Arthur J.; Rademacher, Thomas W.; Parekh, Raj B.; and Dwek, Raymond A., 4,927,630, Cl. 424-94.640.
Howarth, John; and Anderson, Leonard M., to Measurex Corporation. Temperature insensitive moisture sensor. 4,928,013, Cl. 250-339.000.
Howe, Ralph: *See*—
Holloway, Brian R.; Howe, Ralph; Rao, Balbir S.; and Stribling, Donald, 4,927,836, Cl. 514-620.000.
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Hock, Allan G.; Larson, John R.; and Sousa, John G., 4,928,112, Cl. 346-25.000.
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Yang, Ming-he; Chen, Yan-rong; Liu, Geng-tao; and Huang, Liang, 4,927,937, Cl. 546-296.000.
Huang, Wen-Kuei: *See*—
Hsiue, Ging-Ho; and Huang, Wen-Kuei, 4,927,890, Cl. 525-301.000.
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Neuroth, David H., 4,927,386, Cl. 439-589.000.
Huber, Anton, to Siemens Aktiengesellschaft. Electrical function group for a vehicle. 4,927,382, Cl. 439-490.000.
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Hudson Oxygen Therapy Sales Company: *See*—
Cambio, Orlando D., Jr.; and Refsland, Earl R., 4,926,856, Cl. 128-203.260.
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Bernhardt, Gunther; Amort, Jurgen; Kragl, Heinz; and Haas, Margret, 4,927,948, Cl. 556-401.000.
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Hughes Aircraft Company: *See*—
Jensen, Preben B.; and Arnn, Edward L., 4,928,315, Cl. 455-307.000.
Schwartz, Alfred, 4,927,262, Cl. 353-13.000.
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Matsueda, Gary R.; Haber, Edgar; and Hui, Kwan, 4,927,916, Cl. 530-387.000.
Hull, Francis R. Variable hull resistance system for marine vessels. 4,926,771, Cl. 114-61.000.
Hull, Raymond, Jr.: *See*—
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Humberstone, Victor C.: *See*—
Pettigrew, Robert M.; Humberstone, Victor C.; Gardner, Keith; Longman, Robert J.; and Helfet, Peter R., 4,928,132, Cl. 346-135.100.
Hunt, Barry F.; D'Sa, Alwyn P.; and Magnin, Paul A., to Hewlett-Packard Company. Apparatus for forming flow-map images using two-dimensional spatial filters. 4,928,231, Cl. 364-518.000.
Hunter, Jerry J., to Doe Run Tooling, Inc. Set up assembly. 4,927,125, Cl. 269-74.000.
Huntington Medical Research Institutes: *See*—
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Huntsman Chemical Corporation: *See*—
Joyce, James M.; and Kelley, Donald J., 4,927,858, Cl. 521-59.000.
Huron Products Corporation: *See*—
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Hutchings, Carl D.: *See*—
Baumann, Gerald W.; Garthwaite, Albert N.; and Hutchings, Carl D., 4,928,147, Cl. 355-288.000.
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Jenkins, Richard A.; and Hutchinson, Wilbur P., 4,927,072, Cl. 229-92.300.
Hwu, Chyn-Herng. Closed type of line marking device. 4,926,562, Cl. 33-414.000.
Hyder, Walter J.; Kunkle, Albert C.; and Weaver, Robert M., to J. M. Huber Corporation. Kaolin clays for pitch control. 4,927,465, Cl. 106-486.000.
Hydraulic Units, Inc.: *See*—
Leibovich, Gregory, 4,928,028, Cl. 310-23.000.
Ibe, Hiroyuki; Shibagaki, Taro; and Shimizu, Fumihiko. Optical signal transmission system including pulsed FM modulator/demodulator. 4,928,318, Cl. 455-608.000.
Ichida, Katsuya: *See*—
Nishikawa, Shoji; Ohkura, Akira; and Ichida, Katsuya, 4,926,958, Cl. 180-168.000.
Ichida, Yasuteru: *See*—
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Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, to Diesel Kiki Co., Ltd. Spool valve. 4,926,906, Cl. 137-625.300.
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Ichikawa, Katumi: *See*—
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Ichikoh Industries, Ltd.: *See*—
Nakata, Yutaka, 4,928,213, Cl. 362-61.000.
Ichinomiya, Tsutomu; Kami, Tomohiro; Kitagawa, Fumio; Wada, Sumio; Abe, Hideaki; Ise, Youichi; and Kusunoki, Toshio, to Matsushita Electric Works, Ltd. Portable battery powered electromagnetic therapy applicator. 4,926,881, Cl. 128-804.000.
Ichiyanagi, Takashi: *See*—
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ICI Americas Inc.: *See*—
Coogan, Richard G.; and Vartan-Boghossian, Razmik, 4,927,876, Cl. 524-457.000.
Idaho Research Foundation, Inc.: *See*—
Hatcher, Herbert J.; Gallian, John J.; and Leeper, Stephen A., 4,927,757, Cl. 435-105.000.
Idai, Tsutomu: *See*—
Yamagishi, Takanori; Idai, Tsutomu; and Takahashi, Eiji, 4,927,979, Cl. 568-791.000.
Ideal Roofing Company Ltd. Manufactures: *See*—
Beauregard, Albert, 4,926,608, Cl. 52-522.000.
Igarashi, Hideo, to Elm Industry Co., Ltd. Envelope opener. 4,926,729, Cl. 83-364.000.
Igarashi, Hisashi: *See*—
Ohtaka, Shoichi; and Igarashi, Hisashi, 4,926,825, Cl. 123-489.000.
Iguchi, Tatsuya: *See*—
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Ihara Chemical Industry Co., Ltd.: *See*—
Yamaguchi, Mikio; Suzuki, Chiharu; Matsunari, Kenji; Miyazawa, Takeshige; and Nakamura, Yasuo, 4,927,448, Cl. 71-90.000.
Ihara, Susumu: *See*—
Sakimori, Hideharu; Ihara, Susumu; and Hayashi, Hiroyuki, 4,927,314, Cl. 414-416.000.
Ihly Industries, Inc.: *See*—
Vanderlaan, Dirk, 4,927,043, Cl. 220-67.000.
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Iida, Kazuyoshi: *See*—
Mizuno, Keiichiro; Iida, Kazuyoshi; and Murakami, Kazutomo, 4,926,985, Cl. 188-378.000.
Iikubo, Tomohito; and Kurebayashi, Yutaka, to Daido Tokushuko Kabushiki Kaisha. Heat resisting bearing steel. 4,927,601, Cl. 420-111.000.
Iino Shuji, to Minolta Camera Kabushiki Kaisha. Liquid drop ejection apparatus using a magnetic fluid. 4,928,125, Cl. 346-140.00R.
Iizuka, Tetsuya: *See*—
Sato, Mitsuru; Iizuka, Tetsuya; Furuya, Kiyoshi; Shoji, Norio; and Sekine, Masato, 4,928,074, Cl. 330-254.000.
Iizuka, Yoshio, to Kokoku Rubber Industry Company Limited. Pattern input unit. 4,928,092, Cl. 340-707.000.
Ikebe, Yo; and Oku, Hideaki, to Fanuc Ltd. Deflection-insensitive optical rotary encoder. 4,928,009, Cl. 250-231.130.
Ikeda Bussan Co., Ltd.: *See*—
Maruyama, Hidekazu, 4,927,209, Cl. 297-180.000.
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Ikeda, Takayuki: *See*—
Nakamura, Hisashi; Takahashi, Satoshi; Ikeda, Takayuki; and Ogino, Masaaki, 4,926,902, Cl. 137-493.300.
Ima, Seiichiro: *See*—
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Imaizumi, Mitsuyuki: *See*—
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Kim, Jeung T.; and Imam, Imdad, 4,927,342, Cl. 418-63.000.
Imamura, Yasuo: *See*—
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Imco Recycling Inc.: *See*—
Gardner, Owen M.; and Cheek, Ralph L., 4,927,459, Cl. 75-685.000.
Imhof, Ernst: *See*—
Auwarter, Gerhard; Imhof, Ernst; Komaroff, Iwan; Reum, Helmut; Schmid, Gunther; and Kaczynski, Bernhard, 4,926,819, Cl. 123-297.000.
Imoto, Koji; Omura, Tadao; Katsoka, Yoichi; Nakajima, Kunihiko; Maekawa, Motoyuki; Tamura, Hiroki; and Shioya, Yoshiaki, to Mitsubishi Jukogyo Kabushiki Kaisha; and Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Combustion chamber of subchamber type internal combustion engine. 4,926,817, Cl. 123-292.000.
Imperial Chemical Industries PLC: *See*—
Goulding, Terence, 4,927,716, Cl. 428-695.000.
Holloway, Brian R.; Howe, Ralph; Rao, Balbir S.; and Stribling, Donald, 4,927,836, Cl. 514-620.000.
Parry, Keith P.; Worthington, Paul A.; and Rathmell, William G., 4,927,839, Cl. 514-383.000.
Robson, Michael J.; Cleare, Peter J. V.; and Spinney, Mark A., 4,927,852, Cl. 514-531.000.
Impink, Albert J., Jr.; and Goldstein, Norman P., to Westinghouse Electric Corp. Beta ray flux measuring device. 4,927,593, Cl. 376-254.000.

Impink, Albert J., Jr.: *See*—
Heibel, Michael D.; Impink, Albert J., Jr.; and Grobmyer, Louis R., 4,927,594, Cl. 376-258.000.
Imre, Aladar: *See*—
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Inaba, Akira: *See*—
Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, 4,926,906, Cl. 137-625.300.
Inaba, Toru: *See*—
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Inagaki, Jiro: *See*—
Yagi, Nobuyuki; Inagaki, Jiro; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,928,082, Cl. 338-174.000.
Inagaki, Tetsuya; Tagashira, Eijiro; Takaya, Masahiro; and Nishimura, Yasuhiro, to Zeria Pharmaceutical Co., Ltd.; and Hamari Chemicals, Ltd. Preventive and therapeutic agent against liver disorder. 4,927,817, Cl. 514-184.000.
Inco Limited: *See*—
Bell, James A. E.; and Conard, Bruce R., 4,926,792, Cl. 118-729.000.
Inductotherm Europe Limited: *See*—
Simcock, John H., 4,927,460, Cl. 75-10.140.
Industrial Technology Research Institute: *See*—
Tsai, Chong S.; Chen, Shou H.; Li, Bean T.; and Jean, King L., 4,927,664, Cl. 427-57.000.
Infern-O-Therm: *See*—
Martin, Charles K., 4,927,500, Cl. 196-46.000.
Inflation Technologies & Innovation: *See*—
Janko, Michael; and McAllister, Matthew, 4,927,057, Cl. 222-5.000.
Ingersoll-Rand Company: *See*—
Baker, David J.; Dubuque, Kenneth J.; Estep, John M.; and Hix, Charles J., Jr., 4,927,114, Cl. 251-240.000.
Kimberlin, Robert R., 4,926,970, Cl. 184-6.110.
Kimberlin, Robert R., 4,927,323, Cl. 415-98.000.
Ingram, Billy S., II; and Chapin, David S., to Cooper Industries, Inc. Tape measure locking system. 4,927,092, Cl. 242-107.200.
Innovex Inc.: *See*—
Fossum, Steven C.; Sedivy, J. Gregory; and Savick, Wayne K., 4,926,674, Cl. 73-4.00R.
Inokuchi, Hiroshi: *See*—
Hara, Masaaki; Nishikawa, Seigo; Tazaki, Taketoshi; and Inokuchi, Hiroshi, 4,926,604, Cl. 51-165.880.
Inoue, Kiyoshi: *See*—
Kamada, Eiki; Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; and Inoue, Kiyoshi, 4,928,226, Cl. 364-200.000.
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Shibata, Katsuhiro; Azuma, Yuichi; Inoue, Masao; and Okumura, Shinichiro, 4,926,978, Cl. 188-73.100.
Inoue, Nobuhiro, to Kabushiki Kaisha Toshiba. Thermal recording control method and system. 4,928,110, Cl. 346-1.100.
Inoue, Satoru: *See*—
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; Inoue, Satoru; Sugano, Masayo; and Tanako, Hirotaka, 4,927,827, Cl. 514-256.000.
Inoue, Takashi: *See*—
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Institut Francais du Petrole: *See*—
Fay, Hubert, 4,926,686, Cl. 73-151.000.
Intel Corporation: *See*—
Galbi, David; and Kohn, Les, 4,928,259, Cl. 364-745.000.
Intermedics, Inc.: *See*—
Alt, Eckhard, 4,926,863, Cl. 128-419.0PG.
International Biomedics, Inc.: *See*—
Ganguly, Dipankar; and Giuliani, David, 4,926,871, Cl. 128-660.070.
International Business Machines: *See*—
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International Business Machines Corporation: *See*—
Agoglia, Robert J.; Dayan, Richard A.; and Smith, Bruce A., 4,928,193, Cl. 360-78.040.
Baumann, Gerald W.; Garthwaite, Albert N.; and Hutchings, Carl D., 4,928,147, Cl. 355-288.000.
Bealkowski, Richard; Dayan, Richard A.; Doria, David J.; Kinnear, Scott G.; Krantz, Jeffrey I.; Liverman, Robert B.; Sotomayor, Guy G.; Williams, Donald D.; and Vaiskauckas, Gary A., 4,928,237, Cl. 364-200.000.
Biswas, Gautam; Black, David C.; Duncan, Michael G.; Key, Gary R.; Leak, Gordon D.; and Whittington, Robert D., 4,928,306, Cl. 379-201.000.
Chrysler, Gregory; Chu, Richard C.; and Simons, Robert E., 4,928,207, Cl. 361-385.000.
Dampier, Michael S.; Prilik, Ronald J.; and Rapoport, Norman R., 4,928,061, Cl. 324-158.00F.
Dhanakoti, Padmanabhan; Moore, Gerry W.; and Smith, Harold F., 4,927,692, Cl. 428-137.000.
Dhong, Sang H.; Lu, Nicky C.; and Henkels, Walter H., 4,927,779, Cl. 428-52.000.
Eckler, Donald F.; Mankus, John R.; Ripp, Francis J.; and Saxenmeyer Jr., George J., 4,927,387, Cl. 439-499.000.
Ellis, Theron L., 4,927,477, Cl. 156-182.000.
Jones, Alan L.; Snyder, Keith A.; and Winkler, Paul E., 4,927,983, Cl. 174-258.000.
Nielson, Marlin C.; and Woodruff, Kenneth R., 4,928,280, Cl. 371-39.100.
Vriezen, John J.; and Niemeyer, Robin N., 4,928,222, Cl. 364-200.000.
International Communication & Energy, division of International Optical Telecommunications, Inc.: *See*—
Elion, Glenn R., 4,927,856, Cl. 518-702.000.
Interox (Societe Anonyme): *See*—
de la Rosa, Francisco F.; Navarro, Jose A.; Roncel, Mercedes; and de la Rosa, Miguel A., 4,927,512, Cl. 204-157.500.
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Hellquist, Ivan; and Muhlmann, Carl P. M., 4,926,855, Cl. 128-201.280.
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Inui, Shuji; Hiramitsu, Tetsushi; Takahaski, Toshinori; Tamaki, Makoto; Kikuta, Mitsuhiro; and Mizutani, Junichi, to Toyoda Gosei Co., Ltd. Steering wheel. 4,927,364, Cl. 439-15.000.
Inujima, Takashi: *See*—
Hirose, Naoki; Inujima, Takashi; and Takayama, Toru, 4,926,791, Cl. 118-723.000.
Inventio AG: *See*—
Morris, Arnold M.; D'Zurko, Daphne; Pilsbury, Richard H.; Barkell, J. Warren, Jr.; Orndorff, Karl B.; and Lawson Randall S., 4,926,974, Cl. 187-52.0LC.
Morris, Arnold M., 4,926,975, Cl. 187-57.000.
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Iowa State University Research Foundation, Inc.: *See*—
Crawley, H. Bert; Rosenberg, Eli I.; Meyer, W. Thomas; Gorbics, Mark S.; Thomas, William D.; McKay, Roy L.; and Homer, John F., Jr., 4,928,246, Cl. 364-514.000.
IPL Inc.: *See*—
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IRS Industrie Rationalisierungs Systeme GmbH: *See*—
Brennecke, Hermann; Liere, Horst; and Koch, Reinhold, 4,928,255, Cl. 364-558.000.
Irving, Mark E., to Eastman Kodak Company. Silver halide grains and process for their preparation. 4,927,745, Cl. 430-567.000.
Ise, Youichi: *See*—
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Ishibashi, Yukio: *See*—
Naito, Kenzo; Ishibashi, Yukio; and Shinbo, Haruo, 4,927,964, Cl. 562-560.000.
Ishiguro, Mamoru: *See*—
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Ishihara, Masamichi: *See*—
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Ishihara Sangyo Kaisha, Ltd.: *See*—
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Ishihara, Shinobu: *See*—
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Ishikawa, Sueyoshi: *See*—
Hisamoto, Iwao; Hirai, Masaru; and Ishikawa, Sueyoshi, 4,927,950, Cl. 556-419.000.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
Takahashi, Shuzo; Tsuchida, Yutaka; Osada, Shiro; Hasebe, Nobuhisa; and Nakada, Masayuki, 4,926,925, Cl. 164-154.000.
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Electric power steering apparatus for vehicle. 4,926,960, Cl. 180-79.100.
Ishizeki, Seiichi, to Fuji Jukogyo Kabushiki Kaisha. Method of testing a set of wheel speed sensors forming parts of an anti-lock brake control system. 4,926,683, Cl. 73-118.100.
Isoda, Tetsuo; Watanabe, Yoichiro; Nakayama, Nobuhiro; and Aoki, Mitsuo, to Ricoh Company, Ltd. Carrier particles for use in a two-component dry-type developer. 4,927,728, Cl. 430-108.000.
Isogai, Akio: *See*—
Matsumoto, Shinichi; Miyoshi, Naoto; Kimura, Mareo; Ozawa, Masakuni; and Isogai, Akio, 4,927,799, Cl. 502-303.000.
Isono, Toru: *See*—
Nishikawa, Masayuki; Miyazaki, Takeshi; Shigeki, Terumitsu; Mitzutani, Satoshi; and Isono, Toru, 4,927,190, Cl. 285-175.000.
Isovolta Osterreichische Isolierstoffwerke Aktiengesellschaft: *See*—
Melcher, Gerhard, 4,927,699, Cl. 428-203.000.

Isozaki, Kei; Hirashima, Yutaka; and Imamura, Yasuo, to Denki Kagaku Kogyo Kabushiki Kaisha. Chromium carbide sintered body. 4,927,791, Cl. 501-87.000.
Isozaki, Osamu: *See*—
Iwasawa, Naozumi; Isozaki, Osamu; and Nakai, Noboru, 4,927,884, Cl. 525-195.000.
Isorumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Coaxial engine starter. 4,926,706, Cl. 74-7.00A.
Isorumi, Shuzoo: *See*—
Morishita, Akira; Tanaka, Toshinori; and Isorumi, Shuzoo, 4,926,705, Cl. 74-6.000.
Israel Aircraft Industries, Ltd.: *See*—
Zilberman, Moshe; Livne, Mordechai; Tchetchick, Doron; and Daniel, Moshe, 4,926,684, Cl. 73-147.000.
Israel, Gary P.: *See*—
Coup, Michael C.; Israel, Gary P.; Ediger, Glen W.; and Moore, Donald J., 4,927,324, Cl. 415-121.200.
Israel, Larry: *See*—
Soloveychik, Yakov G.; and Israel, Larry, 4,928,170, Cl. 358-94.000.
Isuzu Motors Limited: *See*—
Koshizawa, Toshifumi; Ohkawa, Kiyomi; and Horiuchi, Teruhiko, 4,926,994, Cl. 192-110.00R.
Okada, Masaki, 4,927,077, Cl. 237-2.00A.
Italimpianti of America Incorporated: *See*—
Rau, Robert J.; and Haydo, Donald H., 4,926,668, Cl. 72-289.000.
Ito, Akio, to Jeco Company, Ltd. Driving circuit of a crossed-coil type instrument using digital data pulse production. 4,928,060, Cl. 324-143.000.
Ito, Kaoru: *See*—
Sugiura, Itsuo; Nishida, Yutaka; Ito, Kaoru; and Ozaki, Toshiyuki, 4,927,266, Cl. 356-243.000.
Ito, Masahiko: *See*—
Yoshimi, Tomohisa; Kodama, Satoru; Yoshinori, Takeshi; and Ito, Masahiko, 4,928,090, Cl. 340-575.000.
Ito, Noriaki: *See*—
Torisawa, Akira; Kakizaki, Masaaki; Ito, Noriaki; and Yoshimura, Shigeru, 4,928,050, Cl. 318-696.000.
Ito, Sadaharu. Heat processed food base. 4,927,655, Cl. 426-549.000.
Ito, Sadaharu. Method of producing edible vessel. 4,927,656, Cl. 426-549.000.
Ito, Toshiyasu; Minoura, Jun; Takahashi, Shigeyuki; Mori, Takaaki; Kato, Mamoru; and Funahashi, Toshikazu, to Toyoda Gosei Co., Ltd. Planar electrochromic dimmer. 4,927,246, Cl. 350-357.000.
Ito, Yoshiaki; Nagai, Kougi; Sawada, Akihiko; and Koike, Hideyuki, to Nippondenso Co., Ltd. Radial piston pump. 4,927,338, Cl. 417-462.000.
Ito, Yoshiaki: *See*—
Ezaki, Joichiro; Ito, Yoshiaki; and Matsuzaki, Mikio, 4,928,195, Cl. 360-103.000.
Itoh, Kazuya: *See*—
Kurosawa, Hisoko; Itoh, Kazuya; Nakamura, Hisashi; and Ishihara, Masamichi, 4,928,281, Cl. 371-51.100.
Itoh, Toshibumi: *See*—
Nakaniwa, Shimpei; and Itoh, Toshibumi, 4,926,826, Cl. 123-489.000.
Itow, Hisao: *See*—
Nishino, Yoshitaka; Sawa, Toshio; Obsumi, Katsumi; and Itow, Hisao, 4,927,598, Cl. 376-306.000.
ITT Industries Limited: *See*—
Collier, John C., 4,927,372, Cl. 439-83.000.
ITW-ATECO, GmbH: *See*—
Kross, Manfred; and Plumer, Hans J., 4,926,719, Cl. 81-57.370.
IVF Maschinenfabrik Schaffhausen: *See*—
Burgin, Robert, 4,927,064, Cl. 225-106.000.
Ivy, Eugene S. Radiator tank plates. 4,926,934, Cl. 165-173.000.
Iwai, Kazumi; Koizumi, Hiromi; and Wada, Katsuo, to Hitachi, Ltd. Combustor for gas turbine. 4,926,645, Cl. 60-723.000.
Iwamoto, Toshiichi: *See*—
Yamamoto, Kosei; Kaneyasu, Akira; and Iwamoto, Toshiichi, 4,927,611, Cl. 423-155.000.
Iwanaga, Shin-ichiro; Matsunaga, Tatsuaki; Nishiwaki, Ituo; and Enyo, Hiroji, to Japan Synthetic Rubber Co., Ltd. Conjugated diene copolymer, process for producing the same, and photosensitive resin composition comprising the same. 4,927,738, Cl. 430-286.000.
Iwasa, Yasuhiro: *See*—
Ushikubo, Takao; Iwasa, Yasuhiro; and Yamaji, Yukinori, 4,927,069, Cl. 228-123.000.
Iwasawa, Naozumi; Isozaki, Osamu; and Nakai, Noboru, to Kansai Paint Co., Limited. Curable composition. 4,927,884, Cl. 525-195.000.
Iwashita, Kazuhiro, to Pioneer Electronic Corporation. Billing data display system and terminal used therein for a closed circuit television system. 4,928,168, Cl. 358-84.000.
Iwatsu Electric Co., Ltd.: *See*—
Arai, Minoru; and Katoh, Yukihiro, 4,928,073, Cl. 330-252.000.
Iyer, Natraj C.; Carr, Walter J., Jr.; and Male, Alan T., to Westinghouse Electric Corp. Cryogenic conductor. 4,927,985, Cl. 174-125.100.
J. Eberspacher: *See*—
Worner, Siegfried; Zacke, Peter; and Wirth, Georg, 4,927,608, Cl. 422-179.000.
J. M. Huber Corporation: *See*—
Hyder, Walter J.; Kunkle, Albert C.; and Weaver, Robert M., 4,927,465, Cl. 106-486.000.
Jack, Michael D.; Chapman, George R.; and Ray, Michael, to Santa Barbara Research Center. Method of minimizing implant-related damage to a group II-VI semiconductor material. 4,927,773, Cl. 437-22.000.
Jackson, Graham: *See*—
Jenner, Michael R.; and Jackson, Graham, 4,927,646, Cl. 426-96.000.
Jackson, Norman C., to Standard Products Company, The. Variable-width molding and brightwork. 4,926,610, Cl. 52-716.000.
Jaco, Pamela J.; and Tolbert, Thomas W., to Springs Industries, Inc. Pucker and shrink resistant flame retardant fabric formed of corespun yarns. 4,927,698, Cl. 428-198.000.
Jacobs, Linda Y.; Palmieri, Joseph M.; and Smith, James I., to General Electric Company. Molded case circuit breaker line terminal plug. 4,928,080, Cl. 335-202.000.
Jacobs Suchard AB: *See*—
Hemm, Gerhard; Clausing, Gerhard; and Pietzsch, Heiko, 4,927,028, Cl. 206-618.000.
Jacques, Jean: *See*—
Bouton, Marie-Madeleine; Jacques, Jean; and Pierdet, Andre 4,927,975, Cl. 568-373.000.
Jade, Sivananda S., to Manville Corporation. Process for producing zirconium based granules. 4,927,622, Cl. 423-608.000.
Jagenberg Aktiengesellschaft: *See*—
Weiss, Peter; and Welkers, Knut, 4,927,091, Cl. 242-68.400.
Jaguar Cars Limited: *See*—
Parsons, Bryan N. V., 4,926,811, Cl. 123-193.00P.
James, Allan: *See*—
Mathur, Indresh; James, Allan; and Bissett, David, 4,927,509, Cl. 204-83.000.
James, Kim: *See*—
Baker, Raymond; Carling, William R.; James, Kim; and Leeson, Paul D., 4,927,819, Cl. 514-213.000.
James River Corporation of Virginia: *See*—
Schulz, Galyn A., 4,927,588, Cl. 264-258.000.
James, Robert B., Jr.: *See*—
Kalnes, Tom N.; James, Robert B., Jr.; and Staggs, Darrell W., 4,927,520, Cl. 208-50.000.
Janke, Larry L.: *See*—
Patera, Ginger E.; Janke, Larry L.; and Lampman, William T., 4,927,033, Cl. 211-41.000.
Janko, Michael; and McAllister, Matthew, to Inflation Technologies & Innovation. Automatic inflator for inflatable articles. 4,927,057, Cl. 222-5.000.
Janome Sewing Machine Company Limited: *See*—
Hanyu, Susumu; Hara, Kazumasa; and Sano, Yasuro, 4,926,770, Cl. 112-453.000.
Janosko, Robert J.: *See*—
Blazic, Leonard J.; and Janosko, Robert J., 4,927,108, Cl. 248-311.200.
Jansen, Georg: *See*—
Hass, Rudi; Jansen, Georg; and Kallen, Wilhelm, 4,927,688, Cl. 428-34.600.
Janson, Kurt, to Aktiebolaget A.K. Eriksson. Saw blade tensioning arrangement. 4,926,733, Cl. 83-819.000.
Janssen Pharmaceutica N.V.: *See*—
Lutz, William R.; Verschueren, Wim G.; Fischer, Hanspeter; and Van Lommen, Guy R. E., 4,927,449, Cl. 71-90.000.
Japan Electronic Control Systems Co., Ltd.: *See*—
Nakaniwa, Shimpei; and Itoh, Toshibumi, 4,926,826, Cl. 123-489.000.
Japan Exlan Company Limited: *See*—
Tanaka, Koji; Ueda, Minoru; and Masuda, Taizo, 4,927,710, Cl. 428-394.000.
Japan Synthetic Rubber Co., Ltd.: *See*—
Iwanaga, Shin-ichiro; Matsunaga, Tatsuaki; Nishiwaki, Ituo; and Enyo, Hiroji, 4,927,738, Cl. 430-286.000.
Jean, King L.: *See*—
Tsai, Chong S.; Chen, Shou H.; Li, Bean T.; and Jean, King L., 4,927,664, Cl. 427-57.000.
Jeco Company, Ltd.: *See*—
Ito, Akio, 4,928,060, Cl. 324-143.000.
Jenkins, Richard A.; and Hutchinson, Wilbur P., to Moore Business Forms, Inc. Mailer. 4,927,072, Cl. 229-92.300.
Jenner, Michael R.; and Jackson, Graham, to Tate & Lyle PLC. Sucralose sweetening composition. 4,927,646, Cl. 426-96.000.
Jennings, Robert E.: *See*—
Mears, Eric L.; and Jennings, Robert E., 4,927,438, Cl. 55-385.200.
Jensen, Elmer W.: *See*—
Budinger, William D.; and Jensen, Elmer W., 4,927,432, Cl. 51-298.000.
Jensen, Georg W.: *See*—
Aaslyng, Dorrit A.; Jensen, Georg W.; Schneider, Ib; and Schneider, Palle, 4,927,558, Cl. 252-174.120.
Jensen, Preben B.; and Arnn, Edward L., to Hughes Aircraft Company. Chirped backscatter filter. 4,928,315, Cl. 455-307.000.
Jerome, Robert: *See*—
Teyssie, Philippe; Varshney, Sunil K.; Jerome, Robert; and Fayt, Roger, 4,927,703, Cl. 428-220.000.
Jimenez, Miguel A. Snag-proof safety fishing lure. 4,926,579, Cl. 43-42.440.
JLB Textiles Limited: *See*—
Bulley, John L., 4,926,851, Cl. 128-157.000.
Johannsen, Karl, to O&K Orenstein & Koppel Aktiengesellschaft. Connection for connecting compressed-air lines. 4,926,571, Cl. 37-72.000.

Johansson, Mats O.: *See*—
Dahlinder, Lars-Erik D.; Johansson, Mats O.; Sandberg, John A.; and Sjo, 4,927,640, Cl. 424-497.000.
John Wyeth and Brother Ltd.: *See*—
Crossley, Roger; and Heatherington, Kenneth, 4,927,936, Cl. 546-181.000.
Johns, Bryan: *See*—
Leberl, Franz W.; Karupeck, Milan; Johns, Bryan; and Lee, Scott, 4,928,169, Cl. 358-93.000.
Johns Hopkins University, The: *See*—
Zoltan, Bart J.; Laube, Beth L.; and Adams, George K., III, 4,926,852, Cl. 128-200.230.
Johnson, Arlyn: *See*—
Nichol, Thomas W.; Giske, Edward T.; and Johnson, Arlyn, 4,927,160, Cl. 273-371.000.
Johnson Electric Industrial Manufactory, Limited: *See*—
Wang, Patrick S.; Strobl, Georg; and Chu, Raymond W. H., 4,927,379, Cl. 439-398.000.
Johnson, Gerald D.; Lobsinger, Ralph J.; Hamilton, Margaret L.; and Gelles, David S., to United States of America, Energy. Process for making a martensitic steel alloy fuel cladding product. 4,927,468, Cl. 148-3.000.
Johnson, Grannis S.; Grinstein, Reuben H.; Hartman, Stuart J.; and Dallago, Raymond P., to Henkel Corporation. Polythiols and use as epoxy resin curing agents. 4,927,902, Cl. 528-99.000.
Johnson & Johnson Orthopaedics, Inc.: *See*—
Luckman, Thomas, 4,926,847, Cl. 606-88.000.
Johnson, Marvin M.: *See*—
Tabler, Donald C.; and Johnson, Marvin M., 4,927,795, Cl. 502-33.000.
Johnson, Michael A.: *See*—
Dorn, Gordon L.; and Johnson, Michael A., 4,927,605, Cl. 422-102.000.
Johnson, Ronald M., to General Electric Company. Control assembly for adjusting thermostat setting. 4,926,654, Cl. 62-229.000.
Johnson, Walter A.: *See*—
Kopatz, Nelson E.; Johnson, Walter A.; and Ritsko, Joseph E., 4,927,456, Cl. 75-346.000.
Johnston, Barry. Closed loop system with regenerative heating and pump-driven recirculation of a working fluid. 4,926,643, Cl. 60-691.000.
Johnston, Daniel D. Aerodynamic stabilization system for watercraft. 4,926,778, Cl. 114-273.000.
Johnston, Ronald J., to Aluma Systems Ltd. Truss arrangement. 4,926,593, Cl. 52-126.400.
Jolley, Scott T.; and Salomon, Mary F., to Lubrizol Corporation, The. Liquid compositions containing organic sulfones and sulfoxides. 4,927,554, Cl. 252-68.000.
Joloda Plc.: *See*—
Kordel, Wojciech J., 4,927,316, Cl. 414-510.000.
Jones, Alan L.; Snyder, Keith A.; and Winkler, Paul E., to International Business Machines Corporation. Circuit board. 4,927,983, Cl. 174-258.000.
Jones, Bryan, to Ford Motor Company. Steering column coupling. 4,927,174, Cl. 280-777.000.
Jones, Donald J.: *See*—
Staab, Carl J.; Houser, Kirk D.; Jones, Donald J.; Ihrman, Robert T.; Poepsel, Donald A.; and Edblad, Warren A., 4,928,097, Cl. 340-825.500.
Jones, Donald W.: *See*—
Kliman, Gerald B.; and Jones, Donald W., 4,927,329, Cl. 416-127.000.
Jones, Ellis O.: *See*—
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.
Jones, John S. Luminous golf balls and carrying case therefor. 4,927,015, Cl. 206-315.900.
Jones, Marshall G.: *See*—
Ortiz, Angel L., Jr.; and Jones, Marshall G., 4,927,224, Cl. 350-96.150.
Jones, Roger E.: *See*—
Pitt, Gilles D.; Jones, Roger E.; Antell, George R.; Spicer, Lyndon R.; Barnett, John A.; and Hill, Robert, 4,928,319, Cl. 455-612.000.
Jones, Warren P.: *See*—
Carruth, Walter L.; Jones, Warren P.; and Stacy, Richard B., 4,926,951, Cl. 177-144.000.
Jones, Wescomb R.: *See*—
Buntrock, Kermit A.; English, Daniel R.; and Jones, Wescomb R., 4,927,673, Cl. 427-376.200.
Jones, William R., Jr.: *See*—
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Jonte, Patrick B.: *See*—
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Jordon, Trevor A.: *See*—
Morris, Guy D.; Jordon, Trevor A.; Davidson, William C.; and Bowman, Timothy J., 4,926,802, Cl. 123-52.00M.
Jorion, Bruno; Galiano, Christian; and Wraight, Peter, to Schlumberger Technology Corporation. Apparatus for extracting recorded information from a logging tool. 4,928,088, Cl. 340-854.000.
Joulia, Gerard: *See*—
Morane, Bruno; and Joulia, Gerard, 4,927,282, Cl. 401-129.000.
Joyce, James M.; and Kelley, Donald J., to Huntsman Chemical Corporation. Polyphenylene ether-alkenyl aromatic polymer blends having organobromine additives. 4,927,858, Cl. 521-59.000.
Juijn, Johannes A.: *See*—
Smook, Jan; Vos, Gerardus J. H.; Juijn, Johannes A.; and Van Hees, Theodorus J., 4,927,586, Cl. 264-185.000.
Julian, John C., to Lamb-Weston, Inc. Food processing apparatus. 4,926,726, Cl. 83-165.000.
Justice, Donald R. Horizontal dewatering system. 4,927,292, Cl. 405-43.000.
Kabelmetal Electro GmbH: *See*—
Breitenbach, Otto; Hetz, Helmar; Rous, Friedemann; and Ottenreuther, Josef, 4,927,570, Cl. 264-1.400.
Schauer, Friedrich; and Wolff, Manfred, 4,927,365, Cl. 439-15.000.
Kabeta, Keiji; and Zenbayashi, Michio, to Toshiba Shilicone Co., Ltd. Method of preparing an aminoalkylalkoxysilane. 4,927,949, Cl. 556-413.000.
Kabeta, Keiji; and Syuto, Kiyoaki, to Toshiba Silicone Co., Ltd. Organosilicon compound. 4,927,951, Cl. 556-419.000.
Kabushiki Kaisha Hybec: *See*—
Hayakawa, Futomi; and Onoda, Kazuo, 4,928,210, Cl. 362-217.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katumi; and Fukumura, Seisuke, 4,927,344, Cl. 425-28.100.
Kabushiki Kaisha Nasa: *See*—
Kumani, Hiroo; and Okamoto, Akio, 4,927,651, Cl. 426-324.000.
Kabushiki Kaisha Toshiba: *See*—
Egusa, Syun; Miura, Akira; and Gemma, Nobuhiro, 4,927,589, Cl. 264-259.000.
Inoue, Nobuhiro, 4,928,110, Cl. 346-1.100.
Kawamura, Shigemi; and Yamauchi, Masahide, 4,928,230, Cl. 364-479.000.
Kimura, Sakae; Nikaido, Masaru; Yanagibashi, Katumi; Homma, Katsuhisa; and Ouchi, Yoshiaki, 4,928,034, Cl. 313-346.00R.
Kisou, Masaaki, 4,928,165, Cl. 358-36.000.
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Kushibe, Mitsuhiro; Eguchi, Kazuhiro; Funamizu, Masahisa; and Ohba, Yasuo, 4,928,285, Cl. 372-45.000.
Masuzawa, Yukikazu, 4,928,091, Cl. 340-686.000.
Matsunaga, Taira; and Kimura, Takashi, 4,928,157, Cl. 357-23.130.
Nakagawa, Akio; Ohashi, Hiromichi; Yamaguchi, Yoshihiro; Watanabe, Kiminori; and Thukakoshi, Thuneo, 4,928,155, Cl. 357-23.400.
Ochiai, Kumi; Horie, Hiromichi; Arima, Itsuo; and Morita, Mikio, 4,927,473, Cl. 148-306.000.
Tanaka, Shigeru, 4,928,295, Cl. 378-104.000.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Matsumoto, Shinichi; Miyoshi, Naoto; Kimura, Mareo; Ozawa, Masakuni; and Isogai, Akio, 4,927,799, Cl. 502-303.000.
Nomura, Yoshihiro; and Ohkubo, Yoichiro, 4,927,353, Cl. 431-215.000.
Kabushiki Kaisha Yaskawa Denki Seisakusho: *See*—
Hara, Masaaki; Nishikawa, Seigo; Tazaki, Taketoshi; and Inokuchi, Hiroshi, 4,926,604, Cl. 51-165.880.
Kabuyama, Noriko: *See*—
Yamauchi, Junichi; Maejima, Kimiko; Eguchi, Kaoru; and Kabuyama, Noriko, 4,928,253, Cl. 364-521.000.
Kaczynski, Bernhard: *See*—
Auwarter, Gerhard; Imhof, Ernst; Komaroff, Iwan; Reum, Helmut; Schmid, Gunther; and Kaczynski, Bernhard, 4,926,819, Cl. 123-297.000.
Kada, Yoshio, to Sumitomo Heavy Industries, Ltd. Ship unloader with screw conveyor swingable in various planes. 4,927,311, Cl. 414-140.700.
Kadambi, Vedanth, to General Electric Company. Apparatus for cooling an X-ray device. 4,928,296, Cl. 378-141.000.
Kadar, Janos G.: *See*—
Fenyo, Martha; Borberg, Helmut; and Kadar, Janos G., 4,926,861, Cl. 128-395.000.
Kageyama, Yukihiko: *See*—
Nakane, Toshio; Hijikata, Kenji; Kageyama, Yukihiko; and Takahashi, Katsuhiko, 4,927,895, Cl. 525-438.000.
Kagiya, Tsutomu; Abe, Mitsuyuki; Nishimoto, Seiichi; Shibamoto, Yuta; Shimokawa, Kazuhiro; Hisanaga, Yorisato; Nakada, Tatsuo; and Yoshizawa, Toru, to Yasunori Nishijima & Daikin Industries Ltd. Fluorine-containing nitroazole derivatives and radiosensitizer comprising the same. 4,927,941, Cl. 548-264.800.
Kahle, Charles F., II; McCollum, Gregory J.; and Wilson, Craig A., to PPG Industries, Inc. Preparation of alkyl primary amines. 4,927,969, Cl. 564-377.000.
Kahn, Manfred, to United States of America, Navy. Noise-suppressing hydrophones. 4,928,264, Cl. 367-141.000.
Kaieda, Shozo; Kurashima, Ikuo; Okazima, Hideo; and Mai, Jun, to Kentek Information Systems, Inc. Control circuit for heat fixing device for use in an image forming apparatus. 4,928,055, Cl. 323-300.000.
Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., to Nordson Corporation. Apparatus for depositing particulate material into a pad of fibrous material in a forming chamber. 4,927,346, Cl. 425-81.100.
Kakizaki, Masaaki: *See*—
Torisawa, Akira; Kakizaki, Masaaki; Ito, Noriaki; and Yoshimura, Shigeru, 4,928,050, Cl. 318-696.000.
Kaku, Nobuyuki; Shigemura, Tatsuya; Uesugi, Masaki; Kano, Kiyoshi; and Ogiro, Kenji, to Hitachi, Ltd. Tape loading mechanism for a

rotating drum and cassette type magnetic recording and/or reproduction apparatus. 4,928,191, Cl. 360-85.000.

Kaku, Yasutoshi: *See*—
Yagi, Nobuyuki; Inagaki, Jiro; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,928,082, Cl. 338-174.000.

Kakugo, Masahiro; and Ima, Seiichiro, to Sumitomo Chemical Company, Limited. Polypropylene film. 4,927,872, Cl. 524-232.000.

Kakuta, Yoshiaki. Negative pressure air stream accelerator of suction type air cooling mechanism for internal combustion engine. 4,926,638, Cl. 60-319.000.

Kaldenbach, Willem P., to Allseas Engineering B.V. Method and installation for displacing a jacket of an artificial island in relation to an underwater base. 4,9[illegible],296, Cl. 405-206.000.

Kallen, Wilhelm: *See*—
Hass, Rudi; Jansen, Georg; and Kallen, Wilhelm, 4,927,688, Cl. 428-34.600.

Kalman, Thomas I., to Research Foundation of State University of New York, The. 2-mercaptomethylglutaric acid derivatives. 4,927,966, Cl. 562-594.000.

Kalnes, Tom N.; James, Robert B., Jr.; and Staggs, Darrell W., to UOP. Process for treating a hydrocarbonaceous stream containing a non-distillable component to produce a hydrogenated distillable hydrocarbonaceous product. 4,927,520, Cl. 208-50.000.

Kamada, Eiki; Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; and Inoue, Kiyoshi, to Hitachi, Ltd. Data processor for parallelly executing conflicting instructions. 4,928,226, Cl. 364-200.000.

Kamath, Vasanth R.; and Sargent, James D., to Pennwalt Corporation. Polymer bound light stabilizer coating resins. 4,927,891, Cl. 525-327.300.

Kami, Tomohiro: *See*—
Ichinomiya, Tsutomu; Kami, Tomohiro; Kitagawa, Fumio; Wada, Sumio; Abe, Hideaki; Ise, Youichi; and Kusunoki, Toshio, 4,926,881, Cl. 128-804.000.

Kamiya, Tadao; and Leader, Matthew J., to Shiley Incorporated. Dual optical fiber device. 4,927,222, Cl. 350-96.150.

Kamyr, Inc.: *See*—
Meredith, Michael D.; Phillips, Joseph R.; Laakso, Richard O.; and Stromberg, C. Bertil, 4,927,312, Cl. 414-221.000.

Kanda, Masahiko; and Miyagawa, Yuichi, to Sumitomo Electric Industries, Ltd. Light-reflecting and heating type oximeter. 4,926,867, Cl. 128-633.000.

Kandler, William C., to Tecumseh Products Company. Primer bulb check valve system for an internally vented bowl primer carburetor. 4,926,808, Cl. 123-187.50R.

Kaneko, Shintaro: *See*—
Nishide, Hiroo; and Kaneko, Shintaro, 4,927,725, Cl. 430-54.000.

Kaneuchi, Kunihiro; Yasuda, Seigou; Ariyoshi, Takashi; Nakatani, Tomofumi; and Aizawa, Hiroshi, to Ricoh Company, Ltd. Voice actuated dialing apparatus. 4,928,302, Cl. 379-88.000.

Kaneyasu, Akira: *See*—
Yamamoto, Kosei; Kaneyasu, Akira; and Iwamoto, Toshiichi, 4,927,611, Cl. 423-155.000.

Kannankeril, Charles P., to Sealed Air Corporation. Shipping bag for containers of potentially biohazardous liquids. 4,927,010, Cl. 206-204.000.

Kanno, Masahide: *See*—
Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Hasegawa, Jun; Sasaki, Masahiko; Sasagawa, Katsuyoshi; and Yamashita, Shinji, 4,928,172, Cl. 358-98.000.

Kano, Kiyoshi: *See*—
Kaku, Nobuyuki; Shigemura, Tatsuya; Uesugi, Masaki; Kano, Kiyoshi; and Ogiro, Kenji, 4,928,191, Cl. 360-85.000.

Kansai Paint Co., Limited: *See*—
Iwasawa, Naozumi; Isozaki, Osamu; and Nakai, Noboru, 4,927,884, Cl. 525-195.000.
Shibata, Terukazu; Numa, Nobushige; and Kawamura, Masafumi, 4,927,877, Cl. 525-7.000.

Kapikian, Albert: *See*—
Chanock, Robert M.; Kapikian, Albert; Midthun, Karen; Flores, Jorge; Gorziglia, Mario; Hoshino, Yasutaka; and Peres-Schael, Irene, 4,927,628, Cl. 424-89.000.

Kaplan, Murray A.: *See*—
Bykadi, Gururaj; Kaplan, Murray A.; Corrao, Richard G.; Bara, Edward J.; Ullah, Ismat; and Agharkar, Shreeram N., 4,927,638, Cl. 424-455.000.

Kapples, Kevin J.: *See*—
Shutske, Gregory M.; and Kapples, Kevin J., 4,927,820, Cl. 514-229.500.

Karasawa, Yutaka, to Tamagawa Seiki Kabushiki Kaisha. Multiple rotational position sensor. 4,928,046, Cl. 318-654.000.

Kardos, Peter, to Gas Research Institute. Process for pulse combustion. 4,926,798, Cl. 122-24.000.

Karl Mengele & Sohne Maschinenfabrik und Eisengiesserei GmbH & Co.: *See*—
Fiener, Josef, 4,926,623, Cl. 56-60.000.

Karl, Rupert: *See*—
Braun, Erwin; Strobel, Michael; and Karl, Rupert, 4,926,627, Cl. 57-412.000.

Karol, Thomas J.; and Nalesnik, Theodore E., to Texaco Inc. Elastomer-compatible oxalic acid acylated alkenylsuccinimides. 4,927,562, Cl. 252-51.50A.

Karspeck, Milan: *See*—
Leberl, Franz W.; Karspeck, Milan; Johns, Bryan; and Lee, Scott, 4,928,169, Cl. 358-93.000.

Kasahara, Nobuo; and Wagi, Susumu. Developing device for a color image forming apparatus. 4,928,144, Cl. 355-245.000.

Kasai, Ryusuke, to Nikka Co., Ltd. Composite materials and top materials for retort container. 4,927,677, Cl. 428-36.600.

Kasparek, Alfred: *See*—
Myohl, Jochim; and Kasparek, Alfred, 4,926,887, Cl. 131-91.000.

Kast, Kevin H.: *See*—
Davison, Samuel H.; Kast, Kevin H.; and Clark, Aidan W., 4,928,240, Cl. 364-431.020.

Kataoka, Yoichi: *See*—
Imoto, Koji; Omura, Tadao; Kataoka, Yoichi; Nakajima, Kunihiko; Maekawa, Motoyuki; Tamura, Hiroki; and Shioya, Yoshiaki, 4,926,817, Cl. 123-292.000.

Katayama, Takashi: *See*—
Teraoka, Kazuharu; Satake, Mitsuo; Denda, Toshio; Katayama, Takashi; and Seyasu, Shiro, 4,928,229, Cl. 364-464.010.

Katerberg, James A.: *See*—
Howell, Margene C.; Katerberg, James A.; Pipkorn, David N.; and Wood, Wendell L., 4,928,113, Cl. 346-75.000.

Kato, Akira; and Yano, Toru, to Honda Giken Kogyo K.K. Output correction method for exhaust gas ingredient-concentration sensors. 4,926,827, Cl. 123-489.000.

Kato Hatsujo Kaisha, Ltd.: *See*—
Sato, Seiichi, 4,927,306, Cl. 411-182.000.

Kato, Ikunoshin: *See*—
Sakai, Takeshi; Yokota, Hiroko; Yamamoto, Kazuki; Yokoyama, Sadaji; Matsui, Susumu; Kato, Ikunoshin; and Obayashi, Akira, 4,927,767, Cl. 436-64.000.

Kato, Iwao, to Brother Kogyo Kabushiki Kaisha. Process for producing an electric motor. 4,926,540, Cl. 29-596.000.

Kato, Kichiro, to Toyota Jidosha Kabushiki Kaisha. Fluid pump. 4,927,333, Cl. 417-316.000.

Kato, Mamoru: *See*—
Ito, Toshiyasu; Minoura, Jun; Takahashi, Shigeyuki; Mori, Takaaki; Kato, Mamoru; and Funahashi, Toshikazu, 4,927,246, Cl. 350-357.000.

Kato, Yoshiaki: *See*—
Matsumoto, Takashi; Sato, Masamichi; Yoshida, Satoshi; and Kato, Yoshiaki, 4,928,186, Cl. 360-21.000.

Katoh, Atsushi: *See*—
Kishi, Noriyuki; Katoh, Atsushi; and Saita, Tomohisa, 4,926,823, Cl. 123-432.000.

Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; Inoue, Satoru; Sugano, Masayo; and Tanako, Hirotaka, to Sumitomo Chemical Company, Limited. Pyridinylpyrimidine derivatives, method for production thereof and a fungicide containing them as the active ingredient. 4,927,827, Cl. 514-256.000.

Katoh, Yukihiro: *See*—
Arai, Minoru; and Katoh, Yukihiro, 4,928,073, Cl. 330-252.000.

Katsumata, Ryoichi: *See*—
Mizukami, Toru; Katsumata, Ryoichi; and Oka, Tetsuo, 4,927,758, Cl. 435-107.000.

Katunin, Alexandr N.: *See*—
Komarov, Alexandr N.; Shevtsov, Vitaly T.; Zema, Viktor E.; Lebedik, Grigory L.; Zema, Evgeny M.; Nedorezov, Vladimir A.; Oblovatsky, Anatoly K.; Drozdov, Boris Y.; Zezjulinsky, Andrei A.; Kovalenko, Sergei V.; Litvin, Alexandr N.; Yatsenko, Vladislav P.; and Katunin, Alexandr N., 4,927,121, Cl. 267-47.000.

Katz, Howard S., to Robern, Inc. Bath cabinet mounting and finishing apparatus. 4,927,215, Cl. 312-224.000.

Katzenstein, Henry S., to Brooktree Corporation. Flash analog-to-digital converter with logarithmic/linear threshold voltages. 4,928,102, Cl. 341-154.000.

Kauffman, Kenneth A., to KRB Machinery Co. Separable roller sleeve. 4,926,995, Cl. 193-37.000.

Kaufman, Howard H.; and Nunez, German. Operating room instrument table. 4,927,214, Cl. 312-195.000.

Kaufman, Steven A.: *See*—
DiMarco, Bernard; and Kaufman, Steven A., 4,927,308, Cl. 411-437.000.

Kaufmann, John W.; Swidwa, Kenneth J.; and Hornak, Leonard P., to Westinghouse Electric Corp. Refueling of nuclear reactor. 4,927,595, Cl. 376-268.000.

Kawabata, James, to Contour Saws, Inc. Band saw for cutting shaped pieces of bar stock. 4,926,728, Cl. 83-251.000.

Kawabata, James, to Contour Saws, Inc. Band saw for cutting shaped pieces of bar stock. 4,926,731, Cl. 83-789.000.

Kawabata, Kenji; Ogawa, Soichiro; and Masaki, Ryoichi, to Hitachi, Ltd. Protected discharge lamp lighting system. 4,928,037, Cl. 315-127.000.

Kawabata, Kohji: *See*—
Takaya, Takao; Sakane, Kazuo; Miyai, Kenzi; and Kawabata, Kohji, 4,927,818, Cl. 514-202.000.

Kawaguchi, Noboru: *See*—
Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, 4,927,959, Cl. 560-193.000.

Kawaguchi, Sotoaki: *See*—
Ohta, Kazumi; Kawaguchi, Sotoaki; Doyama, Hisao; and Yano, Yutaka, 4,927,457, Cl. 75-10.630.

Kawahara, Yukito, to Seiko Instruments Inc. Active matrix-addressed picture display device. 4,928,095, Cl. 340-784.000.

Kawai, Kouzi, to Tomoe Technical Research Company. Butterfly valve having a function for measuring a flow rate and method of measuring a flow rate with a butterfly valve. 4,926,903, Cl. 137-554.000.

Kawamoto, Eric H.: *See*—
Holm-Kennedy, James W.; Kawamoto, Eric H.; and Bopp, Thomas T., 4,926,693, Cl. 73-597.000.

Kawamura, Masafumi: *See*—
Shibata, Terukazu; Numa, Nobushige; and Kawamura, Masafumi, 4,927,877, Cl. 525-7.000.

Kawamura, Shigemi; and Yamauchi, Masahide, to Kabushiki Kaisha Toshiba. Automatic transacting apparatus. 4,928,230, Cl. 364-479.000.

Kawanishi, Gosei: *See*—
Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, 4,927,959, Cl. 560-193.000.

Kawasaki, Sadanobu; Yamauchi, Mineo; and Akada, Masanori, to Dai Nippon Insatsu Kabushiki Kaisha. Image-receiving sheet. 4,927,666, Cl. 427-146.000.

Kawata, Ken; Sato, Kozo; and Tsuboi, Masayoshi, to Fuji Photo Film Co., Ltd. Metal-containing organic polymer and use thereof. 4,927,897, Cl. 526-240.000.

Kayoun, Pierre; and Pouyez, Philippe, to Amphenol Socapex. Mechanical holding device for a free-structure optical-fiber cable. 4,928,135, Cl. 350-96.200.

Kaz, Peter N.: *See*—
Davidson, James B.; Kaz, Peter N.; Kidwell, Michael H.; and Zachman, Mark E., 4,926,948, Cl. 172-4.500.

Kazior, Thomas E.; and Durschlag, Mark S., to Raytheon Company. Simultaneous formation of via hole and tube structures for GaAs monolithic microwave integrated circuits. 4,927,784, Cl. 437-203.000.

Kazuo, Inoue; Noriyuki, Kishi; Masao, Kubodera; Eitetsu, Akiyama; Shigeto, Kashiwabara; and Osamu, Takizawa, to Honda Motor Co., Ltd. Supercharging pressure control method for internal combustion engines. 4,926,640, Cl. 60-602.000.

KCL Corporation: *See*—
Branson, Mark E., 4,927,271, Cl. 383-5.000.

Keens, Axel; and Simon, Arno, to Bruke Analytische Messtechnik GmbH. Correction of non-linearities in detectors in fourier transform spectroscopy. 4,927,269, Cl. 356-346.000.

Keilmann, Fritz, to Max Planck-Gesellschaft zur Foerderung der Wissenschaften e.V. Non-self supporting optical device with support structure. 4,927,236, Cl. 350-276.00R.

Keith, Douglas L., to Leland Stanford Junior University, The Board of Trustees of the. Circular magnetron sputtering device. 4,927,515, Cl. 204-298.210.

Kelleher, William J.: *See*—
Sorrentino, James V.; Kelleher, William J.; and Moye, Jeanne O., 4,927,634, Cl. 424-405.000.

Keller, Frank: *See*—
Heinemann, Joachim; Spies, Karl-Heinz; Keller, Frank; Beicht, Bernd; Leitermann, Wulf; and Lechler, Rolf, 4,926,921, Cl. 160-115.000.

Keller, Jakob, to BBC Brown Boveri AG. Contactless centrifugal seal device for a rotating machine part. 4,927,327, Cl. 415-171.100.

Keller, Robert A. Turbocharger lubrication system. 4,926,641, Cl. 60-605.300.

Kelley, Donald J.: *See*—
Joyce, James M.; and Kelley, Donald J., 4,927,858, Cl. 521-59.000.

Kelley, Robert W.: *See*—
Leonard, Patrick F.; Svetkoff, Donald J.; Kelley, Robert W.; Rohrer, Donald K.; and Coleman, E. North, Jr., 4,928,313, Cl. 382-8.000.

Kemmler-Sack, Sibylle; Morlotti, Romano; and Reichardt, Jurgen, to Minnesota Mining and Manufacturing Company. Method for recording and reproducing radiographic images. 4,928,017, Cl. 250-483.100.

Kemske, Jonathon D.: *See*—
Wendt, Dan J.; Kemske, Jonathon D.; and Pesheck, Peter S., 4,927,991, Cl. 219-10.55E.

Kenakkala, Timo: *See*—
Hamala, Sirpa; Heikkila, Matti; Laine, Jouko; Kokkonen, Kari; and Kenakkala, Timo, 4,927,613, Cl. 423-244.000.

Kenmochi, Kazuei: *See*—
Nasu, Kazuhiko; Kenmochi, Kazuei; Niikawa, Tomohiko; and Matsui, Atsushi, 4,927,580, Cl. 264-102.000.

Kenmochi, Toshihisa: *See*—
Tamura, Mitsunobu; Tsuchihashi, Toshifumi; and Kenmochi, Toshihisa, 4,927,358, Cl. 432-204.000.

Kentek Information Systems, Inc.: *See*—
Kaieda, Shozo; Kurashima, Ikuo; Okazima, Hideo; and Mai, Jun, 4,928,055, Cl. 323-300.000.

Keren, Hanan, to Elscint Ltd. Hybrid surface coils. 4,928,064, Cl. 324-322.000.

Kern, Eckhart: *See*—
Porth, Wolfgang; Weibler, Wolfgang; Kern, Eckhart; Hannewald, Thomas; and Weingartner, Reiner, 4,926,821, Cl. 123-399.000.

Kernforschungsanlage Juelich Gesellschaft mit beschraenkter Hagtung: *See*—
Memmert, Klaus; and Wandrey, Christian, 4,927,751, Cl. 435-3.000.

Kershaw, Charles H. Fluid coupled fiber optic sensor. 4,928,006, Cl. 250-201.100.

Kertesz, Denis J.: *See*—
Walker, Keith A. M.; and Kertesz, Denis J., 4,927,963, Cl. 562-501.000.

Key, Gary R.: *See*—
Biswas, Gautam; Black, David C.; Duncan, Michael G.; Key, Gary R.; Leak, Gordon D.; and Whittington, Robert D., 4,928,306, Cl. 379-201.000.

Key, Jonnie L.: *See*—
Ooms, Willem; Moss, Frank R.; and Key, Jonnie L., 4,927,695, Cl. 428-159.000.

Khan, Sadath U.: *See*—
Ghebre-Sellassie, Isaac; Gordon, Robert H.; and Khan, Sadath U., 4,927,639, Cl. 424-497.000.

Khandavalli, Chandra, to Avantek, Inc. Branch line coupler. 4,928,078, Cl. 333-109.000.

Khanna, Dinesh N.: *See*—
Mueller, Werner H.; and Khanna, Dinesh N., 4,927,736, Cl. 430-275.000.

Kicks, Henry W.; and Kicks, Malcolm. Dartboards. 4,927,162, Cl. 273-408.000.

Kicks, Malcolm: *See*—
Kicks, Henry W.; and Kicks, Malcolm, 4,927,162, Cl. 273-408.000.

Kidwell, Michael H.: *See*—
Davidson, James B.; Kaz, Peter N.; Kidwell, Michael H.; and Zachman, Mark E., 4,926,948, Cl. 172-4.500.

Kiefer, Werner: *See*—
Greulich, Norbert; Kiefer, Werner; and Rehm, Veronika, 4,927,442, Cl. 65-18.100.

Kierstead, Richard W.: *See*—
Guthrie, Robert W.; Kierstead, Richard W.; and Tilley, Jefferson W., 4,927,826, Cl. 514-256.000.
Guthrie, Robert W.; Kierstead, Richard W.; Mullin, John G.; and Tilley, Jefferson W., 4,927,838, Cl. 514-337.000.

Kikkoman Corporation: *See*—
Hashimoto, Hikotaka; and Kobayashi, Kunio, 4,926,747, Cl. 99-486.000.

Kikuchi, Nobuyuki: *See*—
Yagi, Nobuyuki; Inagaki, Jiro; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,928,082, Cl. 338-174.000.

Kikuchi, Yoshiaki: *See*—
Hotta, Saburo; Kikuchi, Yoshiaki; Takaya, Masanori; and Inoue, Takashi, 4,927,455, Cl. 71-64.130.

Kikuta, Mitsuhiro: *See*—
Inui, Shuji; Hiramitsu, Tetsushi; Takahaski, Toshinori; Tamaki, Makoto; Kikuta, Mitsuhiro; and Mizutani, Junichi, 4,927,364, Cl. 439-15.000.

Kilgore, Eldon F.; and Kilgore, Howard J. Shade for telescopic sight. 4,926,560, Cl. 33-244.000.

Kilgore, Howard J.: *See*—
Kilgore, Eldon F.; and Kilgore, Howard J., 4,926,560, Cl. 33-244.000.

Kim, Jeung T.; and Imam, Imdad, to General Electric Company. Compressor noise attenuation using branch type resonator. 4,927,342, Cl. 418-63.000.

Kimata, Masafumi, to Mitsubishi Denki Kabushiki Kaisha. Solid-state image sensor having a plurality of horizontal transfer portions. 4,928,158, Cl. 357-24.000.

Kimball, Christopher V.; Stanke, Fred E.; Randall, Curtis J.; and Hayman, Andrew J., to Schlumberger Technology Corporation. Determining impedance of material behind a casing in a borehole. 4,928,269, Cl. 367-35.000.

Kimball Industries, Inc.: *See*—
Frost, Charles, 4,927,119, Cl. 248-550.000.

Kimbel, Kirk L.: *See*—
Adams, Ronald L.; Kimbel, Kirk L.; and Quinn, Clayton B., 4,927,675, Cl. 428-35.900.

Kimberlin, Robert R., to Ingersoll-Rand Company. Lube oil system for rotating machinery. 4,926,970, Cl. 184-6.110.

Kimberlin, Robert R., to Ingersoll-Rand Company. Radial flow fluid pressure module. 4,927,323, Cl. 415-98.000.

Kimberly-Clark Corporation: *See*—
Bryson, Robert E., 4,927,582, Cl. 264-113.000.

Kimmel, Steven A.: *See*—
Genbauffe, Francis S.; and Kimmel, Steven A., 4,927,996, Cl. 219-413.000.

Kimura, Hirosi: *See*—
Arima, Noburu; Ogino, Nobuyosi; and Kimura, Hirosi, 4,926,793, Cl. 118-730.000.

Kimura, Kyoichiro: *See*—
Hayashida, Suetou; Kimura, Kyoichiro; and Takahashi, Eiji, 4,927,885, Cl. 525-211.000.

Kimura, Mareo: *See*—
Matsumoto, Shinichi; Miyoshi, Naoto; Kimura, Mareo; Ozawa, Masakuni; and Isogai, Akio, 4,927,799, Cl. 502-303.000.

Kimura, Sakae; Nikaido, Masaru; Yanagibashi, Katumi; Homma, Katsuhisa; and Ouchi, Yoshiaki, to Kabushiki Kaisha Toshiba. Impregnated cathode. 4,928,034, Cl. 313-346.00R.

Kimura, Takashi: *See*—
Matsunaga, Taira; and Kimura, Takashi, 4,928,157, Cl. 357-23.130.

Kinberg, Benjamin. Luminescent writing or display device. 4,927,748, Cl. 434-410.000.

King, Allen B.; and Perfetti, Thomas J., to Exci-Tech Industries, Inc. Ski-mountable device for scraping boots. 4,927,176, Cl. 280-813.000.

King, David Q.: *See*—
Deininger, William D.; and King, David Q., 4,928,027, Cl. 310-11.000.

King, Donald D., to Thermo King Corporation. Air conditioner unit suitable for mounting on the roof of a vehicle. 4,926,655, Cl. 62-244.000.

King, Roswell; E., III; Foster, George N.; and Petty, Herbert E., to Union Carbide Chemicals and Plastics Company Inc. Polysiloxanes with sterically hindered heterocyclic moiety. 4,927,898, Cl. 528-27.000.

Kinnear, Scott G.: *See*—
Bealkowski, Richard; Dayan, Richard A.; Doria, David J.; Kinnear, Scott G.; Krantz, Jeffrey I.; Liverman, Robert B.; Sotomayor, Guy G.; Williams, Donald D.; and Vaiskauckas, Gary A., 4,928,237, Cl. 364-200.000.

Kino, Gordon S.; and Xiao, Guoqing, to Leland Stanford Junior University, The Board of Trustees of the. Scanning confocal optical microscope including an angled apertured rotating disc placed between a pinhole and an objective lens. 4,927,254, Cl. 350-507.000.

Kinoshita, Naoyoshi: *See*—
Kusumoto, Keiji; and Kinoshita, Naoyoshi, 4,928,136, Cl. 355-315.000.

Kinoshita, Takao, to Canon Kabushiki Kaisha. Image sensing apparatus having a low-resolution monitor means for reducing the amount of information in an image signal, and switching means for reducing power consumption in various operating modes. 4,928,137, Cl. 358-213.260.

Kioustelidis, Johannes: *See*—
Kloetzer, Erhard; Kioustelidis, Johannes; and Schmidt, Guenter, 4,927,463, Cl. 106-109.000.

Kirbach, Eberhard. Feed speed and guide arm control for sawing logs. 4,926,917, Cl. 144-356.000.

Kirby, Neil V.; Street, Peter F. S.; and Markley, Lowell D., to Dow Chemical Company, The. Substituted azoles and their use as fungicides. 4,927,833, Cl. 514-399.000.

Kirchgessner, James A.: *See*—
Alvarez, Antonio R.; and Kirchgessner, James A., 4,927,775, Cl. 437-31.000.

Kirchgessner, Steven J. Directional control device. 4,927,987, Cl. 200-5.00R.

Kirkbride, M.: *See*—
McMurtry, D. R.; Stephess, W. F. N.; and Kirkbride, M., 4,926,566, Cl. 33-771.000.

Kise, Masahiro; Yoshimoto, Yoshihiko; Fujisawa, Hiroshi; Sasaki, Yasuo; and Yasufuku, Shoji, to Nippon Shinyaku Co., Ltd. Acylphenol derivatives, useful as anti-inflammatory agents and pain suppressants. 4,927,835, Cl. 514-448.000.

Kish, Jules G.: *See*—
Stone, Robert A.; and Kish, Jules G., 4,926,991, Cl. 192-41.00S.

Kishi, Noriyuki; Katoh, Atsushi; and Saita, Tomohisa, to Honda Giken Kogyo Kabushiki Kaisha. Method of controlling an air/fuel ratio or an internal combustion engine. 4,926,823, Cl. 123-432.000.

Kishino, Koji, to Mazada Motor Corporation. Glass construction for an automobile. 4,927,207, Cl. 296-185.000.

Kisou, Masaaki, to Kabushiki Kaisha Toshiba. Noise reduction circuit for a chrominance signal of a using frame correlation. 4,928,165, Cl. 358-36.000.

Kita, Tatsuya; Shigemura, Takuro; Nakamura, Setsuo; and Nakane, Hisanori, to Mazda Motor Corporation. Rotary piston engine. 4,926,816, Cl. 123-203.000.

Kitagaki, Kazunori: *See*—
Yamamoto, Hajime; Takashima, Yuji; Kitagaki, Kazunori; and Nakamura, Masahiko, 4,927,724, Cl. 430-45.000.

Kitagawa, Fumio: *See*—
Ichinomiya, Tsutomu; Kami, Tomohiro; Kitagawa, Fumio; Wada, Sumio; Abe, Hideaki; Ise, Youichi; and Kusunoki, Toshio, 4,926,881, Cl. 128-804.000.

Kitagawa Industries Co., Ltd.: *See*—
Takahashi, Katsumasa, 4,927,111, Cl. 248-500.000.

Kitahara, Shigehisa; Ohtsu, Akira; and Fujii, Katsuhiko, to Teijin Limited. γ-L-glutamyl-L-cysteine ethyl ester and pharmaceutical compositions containing the same as an effective ingredient. 4,927,808, Cl. 514-19.000.

Kitamoto, Manabu, to Kabushiki Kaisha Toshiba. Air conditioner system with control for optimum refrigerant temperature. 4,926,652, Cl. 62-175.000.

Kitamura, Yoshio; Takizuka, Hiroshi; and Ishihara, Tadao, to Sony Corporation. Data processor system and method. 4,928,234, Cl. 364-200.000.

Kitayama, Taku: *See*—
Matsubara, Toshihiko; and Kitayama, Taku, 4,927,707, Cl. 428-323.000.

Kiyono, Mikio, to NEC Corporation. Balanced lightwave transmission system. 4,927,221, Cl. 350-96.140.

Klapper, Kenneth K.: *See*—
Huggins, Thomas B.; Widener, Wade H.; and Klapper, Kenneth K., 4,927,313, Cl. 414-414.000.

Klees, George N.: *See*—
Franklin, Hugh L.; Whatley, Leslie H.; and Klees, George N., 4,928,059, Cl. 324-123.00R.

Kleinhappl, Erich: *See*—
Fischer, Fritz; Kleinhappl, Erich; and Marsoner, Hermann, 4,927,603, Cl. 422-67.000.

Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, to Nabisco Brands, Inc. Tris-hydroxymethyl alkane esters as low calorie fat mimetics. 4,927,658, Cl. 426-611.000.

Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, to Nabisco Brands, Inc. Tris-hydroxymethyl lower alkane esters as fat mimetics. 4,927,659, Cl. 426-611.000.

Kleven, Lowell A.; and Corpron, Gary P., to Rosemount Inc. Rocking beam vortex sensor. 4,926,695, Cl. 73-861.240.

Kliman, Gerald B.; and Jones, Donald W., to General Electric Company. Aircraft engine unducted fan blade pitch control system. 4,927,329, Cl. 416-127.000.

Kline, Donald, to Panavision, Inc. Video assist system for motion-picture camera. 4,928,171, Cl. 358-97.000.

Klinner, Wilfred E.: *See*—
Neale, Michael A.; and Klinner, Wilfred E., 4,926,749, Cl. 100-177.000.

Kloetzer, Erhard; Kioustelidis, Johannes; and Schmidt, Guenter, to Biochemie Ladenburg GmbH. Aqueous dispersion of gypsum and its use as a filler and coating pigment in the production of paper and cardboard. 4,927,463, Cl. 106-109.000.

Kloosterman, David, to Eastman Kodak Company. Combination erase device. 4,928,142, Cl. 355-218.000.

Klopfenstein, Rick; and Kreitzer, Tom. Portable, collapsible ice fishing shelter. 4,926,893, Cl. 135-106.000.

Kluttz, James S., to NCR Corporation. Switch mode power supply start-up circuit. 4,928,218, Cl. 363-37.000.

KMS Fusion, Inc.: *See*—
Glass, Alexander J., 4,928,153, Cl. 356-343.000.

Knabel, Horst, to Rheinmetall GmbH. Measuring device for determining the position of workpiece faces. 4,926,559, Cl. 33-832.000.

Knapp, Gordon G.: *See*—
Wright, William E.; Davis, Bryan T.; Matteson, Donald S.; and Knapp, Gordon G., 4,927,553, Cl. 252-49.600.

Knibbe, Engel J., to U.S. Philips Corp. Camera with well defined shutter and suitable for recording television and cinematographic images. 4,928,180, Cl. 358-213.130.

Knight, Gerald L. Veterinary liniment and method. 4,927,641, Cl. 424-665.000.

Knopf, Robert J.; Theiling Jr., Louis F.; and Berti, Leroy P., to Union Carbide Chemicals and Plastics Company, Inc. Continuous process for producing secondary alcohols and carboxylic acid esters. 4,927,954, Cl. 558-441.000.

Knowles, David G., to Cameron Iron Works USA, Inc. Retrievable guide post system. 4,927,295, Cl. 405-195.000.

Knowles, Steve: *See*—
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,926,632, Cl. 60-203.100.

Knox, David E.; and Fischer, Eugene R., to Westvaco Corporation. Oil field corrosion inhibition. 4,927,669, Cl. 427-239.000.

Knudsen, Arne K.; Delzer, Scott H.; and Langhoff, Charles A. Laser flash thermal conductivity apparatus and method. 4,928,254, Cl. 364-556.000.

Kobayashi, Kenichi, to Fuji Xerox Co., Ltd. Thin-film transistor and wiring matrix device and its forming method. 4,928,161, Cl. 357-71.000.

Kobayashi, Kunio: *See*—
Hashimoto, Hikotaka; and Kobayashi, Kunio, 4,926,747, Cl. 99-436.000.

Kobayashi, Masaharu; and Nishimura, Yukio, to Hitachi, Ltd.; and Hitachi Video Engineering, Ltd. Rotary head type recording/reproducing method and apparatus for recording and reproducing a digital audio signal. 4,928,185, Cl. 360-19.100.

Kobayashi, Setsuo: *See*—
Era, Susumu; Kobayashi, Setsuo; and Mukoh, Akio, 4,927,735, Cl. 430-270.000.

Kobayashi, Shinobu: *See*—
Yoshioka, Hiroshi; Nagatsuma, Nobuyoshi; and Kobayashi, Shinobu, 4,926,972, Cl. 184-109.000.

Kobayashi, Takayuki: *See*—
Winkler, Robert; Sala, Siro; Kobayashi, Takayuki; and Yokota, Shinjiro, 4,927,494, Cl. 159-2.100.

Koch, Reinhold: *See*—
Brennecke, Hermann; Liere, Horst; and Koch, Reinhold, 4,928,255, Cl. 364-558.000.

Kochka, Edgar L.: *See*—
Campbell, Robert B.; Kochka, Edgar L.; and Piotrowski, Paul A., 4,927,489, Cl. 156-620.100.

Kochs Adler Aktiengesellschaft: *See*—
Upmeier, Egon, 4,926,769, Cl. 112-121.120.

Kodama, Satoru: *See*—
Yoshimi, Tomohisa; Kodama, Satoru; Yoshinori, Takeshi; and Ito, Masahiko, 4,928,090, Cl. 340-575.000.

Kodera, Masaya: *See*—
Morizumi, Mitsuo; Omura, Kinya; Arita, Eriya; Furuya, Katsuji; Yasuda, Sakae; and Kodera, Masaya, 4,926,914, Cl. 141-59.000.

Kohanyi, Laszlo : *See*—
Harsanyi, Jozsef; Kohanyi, Laszlo ; Domsa, Karoly; Szakacs, Lajos; Szentgyorgyi, Geza; and Imre, Aladar, 4,927,549, Cl. 252-25.000.

Kohling, Alfons: *See*—
Friehmelt, Volker; Maier, Bernhard; Kohling, Alfons; and Schmitt, Rolf-Eberhard, 4,927,511, Cl. 204-151.000.

Kohm, Thomas S., to Kollmorgen Corporation. Multilayer printed wiring boards. 4,927,742, Cl. 430-311.000.

Kohn, Les: *See*—
Galbi, David; and Kohn, Les, 4,928,259, Cl. 364-745.000.

Kohut, Frank R. Apparatus for replacing a door panel. 4,926,536, Cl. 29-238.000.

Koike, Hideyuki: *See*—
Ito, Yoshiaki; Nagai, Kougi; Sawada, Akihiko; and Koike, Hideyuki, 4,927,338, Cl. 417-462.000.

Koike, Yutaka: *See*—
Tanaka, Seiichi; Koike, Yutaka; Nakano, Masato; Atsuumi, Shugo; Morishima, Hajime; and Matsuyama, Kenji. 4,927,565, Cl. 260-404.500.

Koishi, Musubu: *See*—
Takahashi, Akira; and Koishi, Musubu. 4,928,248, Cl. 372-38.000.

Koito Manufacturing Co., Ltd.: *See*—
Fujino, Yuuji; and Nakamura, Yasuhiro. 4,928,215, Cl. 362-61.000.
Sakakibara, Koichi; and Ozawa, Yasuo. 4,927,248, Cl. 350-452.000.

Koizumi, Hiromi: *See*—
Iwai, Kazumi; Koizumi, Hiromi; and Wada, Katsuo. 4,926,645, Cl. 60-723.000.

Kokado, Masayuki, to Fujitsu Limited. Emitter coupled logic circuit. 4,928,025, Cl. 307-455.000.

Kokkonen, Kari: *See*—
Hamala, Sirpa; Heikkila, Matti; Laine, Jouko; Kokkonen, Kari; and Kenakkala, Timo. 4,927,613, Cl. 423-244.000.

Kokoku Rubber Industry Company Limited: *See*—
Iizuka, Yoshio. 4,928,092, Cl. 340-707.000.

Kolb, Bruno: *See*—
Pospisil, Peter; and Kolb, Bruno. 4,927,532, Cl. 210-198.200.

Kollmorgen Corporation: *See*—
Kohm, Thomas S., 4,927,742, Cl. 430-311.000.

Kolowski, Michael A.: *See*—
Hopkins, William M.; Brightwell, Robert A.; Young, Ray A.; Clark, John K.; Miller, Frederick W.; Galante, Richard L.; Waibel, Terry J.; and Kolowski, Michael A., 4,926,919, Cl. 152-209.00R.

Komaroff, Iwan: *See*—
Auwarter, Gerhard; Imhof, Ernst; Komaroff, Iwan; Reum, Helmut; Schmid, Gunther; and Kaczynski, Bernhard, 4,926,819, Cl. 123-297.000.

Komarov, Alexandr N.; Shevtsov, Vitaly T.; Zema, Viktor E.; Lebedik, Grigory L.; Zema, Evgeny M.; Nedorezov, Vladimir A.; Oblovatsky, Anatoly K.; Drozdov, Boris Y.; Zezjulinsky, Andrei A.; Kovalenko, Sergei V.; Litvin, Alexandr N.; Yatsenko, Vladislav P.; and Katunin, Alexandr N. Spring leaf with a diminishing thickness towards the ends thereof and having shoulders on opposite sides. 4,927,121, Cl. 267-47.000.

Kon, Kenji: *See*—
Yamada, Nobutoshi; Sugi, Hideo; and Kon, Kenji, 4,927,919, Cl. 536-17.400.

Kondo, Hiroshi: *See*—
Yoshizawa, Tetsuo; Terayama, Yoshimi; Kondo, Hiroshi; Sakaki, Takashi; Haga, Shunichi; Ichida, Yasuteru; and Konishi, Masaki, 4,926,549, Cl. 29-876.000.

Kondo, Masao; and Abe, Yasunao, to Yamaha Corporation. Electronic rhythm performing apparatus generating both manual and automatic rhythm tones. 4,926,738, Cl. 84-618.000.

Konica Corporation: *See*—
Bartlett, Kenneth G.; and Walberg, Per-Erik, 4,928,192, Cl. 360-77.080.
Koshizuka, Kunihiro; Tezuka, Toshiaki; Abe, Takao; and Ebisawa, Haruo, 4,927,693, Cl. 428-141.000.

Konishi, Masaki: *See*—
Yoshizawa, Tetsuo; Terayama, Yoshimi; Kondo, Hiroshi; Sakaki, Takashi; Haga, Shunichi; Ichida, Yasuteru; and Konishi, Masaki, 4,926,549, Cl. 29-876.000.

Konishi, Masataka; Shimizu, Keiko; Ohbayashi, Masaru; Tomita, Koji; Miyaki, Takeo; and Oki, Toshikazu, to Bristol-Myers Company. BU-3839T antibiotic. 4,927,848, Cl. 514-453.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Hasegawa, Tai; Monnai, Jun; and Matsuzaki, Masatoshi, 4,928,134, Cl. 346-76.0PH.

Kontron Instruments Holdings, NV.: *See*—
Tompkins, David J., 4,926,701, Cl. 73-864.150.

Kopatz, Nelson E.; Johnson, Walter A.; and Ritsko, Joseph E., to GTE Products Corporation. Hydrometallurgical process for producing finely divided iron based powders. 4,927,456, Cl. 75-346.000.

Kopilovitsch, Heinz: *See*—
Durchschlag, Gerald; Lang, Alfred; Rotter, Franz; Fritz, Dieter; and Kopilovitsch, Heinz, 4,927,102, Cl. 246-469.000.

Koppl Industrial Systems, Inc.: *See*—
Moore, Billy G., 4,927,182, Cl. 285-15.000.

Korber AG: *See*—
Lorenzen, Heinz-Christen; Heitmann, Uwe; Siems, Wolfgang; and Pinck, Peter, 4,926,886, Cl. 131-84.400.
Myohl, Jochim; and Kasparek, Alfred, 4,926,887, Cl. 131-91.000.

Kordel, Wojciech J., to Joloda Plc. Cargo space utilization. 4,927,316, Cl. 414-510.000.

Korniski, Thomas J.: *See*—
Butler, James W.; Korniski, Thomas J.; and Colvin, Alex D., 4,928,015, Cl. 250-343.000.

Kosarko, Gerald J.: *See*—
Elly, James E.; and Kosarko, Gerald J., 4,928,194, Cl. 360-97.040.
Hickok, William K.; Riley, John M.; and Kosarko, Gerald J., 4,928,196, Cl. 360-105.000.

Koshizawa, Toshifumi; Ohkawa, Kiyomi; and Horiuchi, Teruhiko, to Isuzu Motors Limited. Automatic clutch control apparatus. 4,926,994, Cl. 192-110.00R.

Koshizuka, Kunihiro; Tezuka, Toshiaki; Abe, Takao; and Ebisawa, Haruo, to Konica Corporation. Thermal transfer recording medium and its manufacturing method. 4,927,693, Cl. 428-141.000.

Koslowski, Gerhard; and Bollen, Manfred, to Benninger AG. Apparatus for giving protection from draft and dust at a winding machine. 4,926,531, Cl. 28-173.000.

Kotani, Masanori: *See*—
Masuda, Masaaki; Kotani, Masanori; Wakahara, Katsuhiro; and Sakata, Shuichi, 4,926,653, Cl. 62-204.000.

Kotani, Matahira: *See*—
Tanaka, Hironori; Kotani, Matahira; and Matsumoto, Masafumi, 4,927,130, Cl. 271-10.000.

Koterazaka, Toshiyuki: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.

Kotlarek, Peter A.: *See*—
Riffe, Delmar R.; Kotlarek, Peter A.; and Utter, Robert E., 4,927,339, Cl. 418-55.000.

Kotz, Steven P.; and Lane, John H., to Pullman Company, The. Ball joint design. 4,927,285, Cl. 403-133.000.

Kotzur, Joachim: *See*—
Buthmann, Peter; and Kotzur, Joachim, 4,926,642, Cl. 60-607.000.

Kovacs, Stephen G., to University of South Florida. Method for fabricating prosthesis material. 4,927,410, Cl. 600-36.000.

Kovalenko, Sergei V.: *See*—
Komarov, Alexandr N.; Shevtsov, Vitaly T.; Zema, Viktor E.; Lebedik, Grigory L.; Zema, Evgeny M.; Nedorezov, Vladimir A.; Oblovatsky, Anatoly K.; Drozdov, Boris Y.; Zezjulinsky, Andrei A.; Kovalenko, Sergei V.; Litvin, Alexandr N.; Yatsenko, Vladislav P.; and Katunin, Alexandr N., 4,927,121, Cl. 267-47.000.

Koyama, Tadao: *See*—
Mori, Nobufumi; Muraishi, Katsuaki; Matsuda, Terumi; Ohnishi, Masahiro; Nunome, Hiromi; Koyama, Tadao; and Oikawa, Tetsuo, 4,928,016, Cl. 250-440.100.

Koyama, Tadayoshi: *See*—
Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, 4,927,959, Cl. 560-193.000.

Koyanagi, Haruo; Kumasaka, Hideyuki; Takao, Koji; and Noda, Tomohiko, to Nissan Motor Co., Ltd. Production system using unmanned automatically guided vehicles. 4,926,544, Cl. 29-703.000.

Koyo Seiko Co., Ltd.: *See*—
Kusumoto, Hirotaka; and Shiraki, Toshihiko, 4,926,993, Cl. 192-98.000.

Kozuki, Koichi, to Yamaha Corporation. Electronic musical instrument with automatic performance apparatus. 4,926,736, Cl. 84-609.000.

Kragl, Heinz: *See*—
Bernhardt, Gunther; Amort, Jurgen; Kragl, Heinz; and Haas, Margret, 4,927,948, Cl. 556-401.000.

Krambeck, Frederick J.: *See*—
Anderson, Conroy D.; Chou, Tai-Sheng; Cormier, William E., Jr.; Dwyer, Francis G.; Krambeck, Frederick J.; Pasquale, Gary M.; Schipper, Paul H.; and Stover, William A., 4,927,526, Cl. 208-152.000.

Kramer, Claus: *See*—
Taubitz, Bernd; Zieher, Peter; Kramer, Claus; Engelsdorf, Kurt; and Schuelke, Armin, 4,926,983, Cl. 188-299.000.

Kramer, George C.; and Perron, Paul R., to University of California, The Regents of the. Saturated salt/concentrated dextran formulation to treat hemorrhage. 4,927,806, Cl. 514-2.000.

Kramer, James H., to B. F. Goodrich Company, The. Conveyor support. 4,927,007, Cl. 198-823.000.

Kramer, Wolfgang: *See*—
Wollweber, Detlef; Kramer, Wolfgang; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 4,927,844, Cl. 514-425.000.

Krantz, Jeffrey I.: *See*—
Bealkowski, Richard; Dayan, Richard A.; Doria, David J.; Kinnear, Scott G.; Krantz, Jeffrey I.; Liverman, Robert B.; Sotomayor, Guy G.; Williams, Donald D.; and Vaiskauckas, Gary A., 4,928,237, Cl. 364-200.000.

Kranz, Paul R.: *See*—
Brock-Fisher, George A.; Kranz, Paul R.; Mniece, James R.; Thiele, Karl E.; Savord, Bernard J.; and Smith, Richard B., 4,926,872, Cl. 128-661.010.

Kranz, Walter, to Messerschmitt-Bolkow-Blohm GmbH. Rotor setting system in conjunction with aerodynamic body controls. 4,927,096, Cl. 244-3.220.

Krasuski, Marek; and Prugnolle, Bernard, to Societe Anonyme dite: ALCATEL SATMAN. Machine for inserting mail into envelopes. 4,926,612, Cl. 53-69.000.

KRB Machinery Co.: *See*—
Kauffman, Kenneth A., 4,926,995, Cl. 193-37.000.

Kreft, Hans-Diedrich; MacKenthun, Holger; and Hass, Wolfgang, to Angewandte Digital Electronik GmbH. Phase-stabilized, phase-coupled resonant circuit. 4,928,087, Cl. 340-825.710.

Kreitzer, Tom: *See*—
Klopfenstein, Rick; and Kreitzer, Tom, 4,926,893, Cl. 135-106.000.

Kretchmer, Steven D., to Kretchmer, Steven D.; and Stern Metals, Inc. Method for making multi-colored composite laminates. 4,927,070, Cl. 228-155.000.

Kriaucionas, G. Vincent; and Vance, Karen, to Northgate Research, Inc. Lithotriptor device for trapping and destroying concretions. 4,927,427, Cl. 606-128.000.

Krishnakumar, Suppayan M.: *See*—
Collette, Wayne N.; Krishnakumar, Suppayan M.; and Piccioli, David P., 4,927,680, Cl. 428-36.920.

Krishnan, Satya: *See*—
Huang, Anthony H.; and Krishnan, Satya, 4,927,571, Cl. 264-4.300.

Kroes, Anthony; and Van Engen, Pieter G., to U.S. Philips Corp. Electrodeless low-pressure discharge lamp. 4,927,217, Cl. 315-248.000.

Krohm, Inc.: *See*—
Osmonson, Daniel T.; and McNulty, James L., 4,926,892, Cl. 135-103.000.

Kromer, Gunter: *See*—
Putz, Heinrich; Nowitzki, Friedhelm; Damm, Gunter; Bathelt, Hartmut; Kromer, Gunter; Hoffmann, Henning; and Pischke, Reiner. 4,926,634, Cl. 60-274.000.

Krongauz, Valeri A.; and Shvartsman, Felix P., to Yeda Research and Development Co., Ltd. Quasi-liquid crystals. 4,927,917, Cl. 534-567.000.

Krongold, Martin A.: *See*—
Wieland, Rolf H.; and Krongold, Martin A., 4,927,433, Cl. 55-18.000.

Kropielnicki, Jerzy J.; Easter, Brian; and Last, James D., to BSH Electronics, Ltd. Electrical signal separating device having isolating and matching circuitry for split passband matching. 4,928,108, Cl. 343-704.000.

Kross, Manfred; and Plumer, Hans J., to ITW-ATECO, GmbH. Supplementary device for inserting screws by means of a power-driven screw driver. 4,926,719, Cl. 81-57.370.

Krueger, Brian: *See*—
Polczynski, Mark; and Krueger, Brian, 4,926,546, Cl. 29-840.000.

Krueger, Keith T.: *See*—
Wight, Donald C.; and Krueger, Keith T., 4,927,982, Cl. 174-50.000.

Krupp Polysius AG: *See*—
Henne, Heinrich; Dammertz, Karl-Heinz; Schneider, Lutz T.; and Blaszcyk, Gotthard, 4,927,086, Cl. 241-80.000.

Kubota, Ltd.: *See*—
Murakawa, Masatake; Bando, Niro; Tone, Masatsugu; Yuki, Mikio; Miyata, Junji; Hayashi, Tetsuaki; and Kurohara, Kazuaki, 4,926,624, Cl. 56-202.000.

Kuczek, Stanley W.: *See*—
Haire, Allen; Abele, Alan C.; and Kuczek, Stanley W., 4,927,355, Cl. 431-329.000.

Kudo, Yoshinobu: *See*—
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,928,124, Cl. 354-106.000.

Kudoh, Noboru; Hirukawa, Itsushi; Aoki, Satoshi; Yoshimura, Tsuyoshi; and Shiozawa, Shigeki, to Sanshin Kogyo Kabushiki Kaisha. Gas exhaustion device for inboard/outboard engine. 4,927,390, Cl. 440-88.000.

Kuga, Shigeki: *See*—
Tanaka, Toshiyuki; Kuga, Shigeki; Nakamura, Nobuo; Morishita, Taro; and Wada, Masahiro, 4,928,236, Cl. 364-513.000.

Kuhle, Engelbert: *See*—
Adler, Alfons; Widdig, Arno; Kuhle, Engelbert; Fuhrer, Wolfgang; Hagemann, Hermann; and Hanssler, Gerd, 4,927,824, Cl. 514-241.000.

Kuijk, Karel E., to U.S. Philips Corp. Optical imaging system having an electronically variable focal length and optical image sensor provided with such a system. 4,927,241, Cl. 350-336.000.

Kulli, John C. Syringe with safety retracting needle. 4,927,414, Cl. 604-110.000.

Kumani, Hiroo; and Okamoto, Akio, to Kabushiki Kaisha Nasa. Method of preserving food. 4,927,651, Cl. 426-324.000.

Kumasaka, Hideyuki: *See*—
Koyanagi, Haruo; Kumasaka, Hideyuki; Takao, Koji; and Noda, Tomohiko, 4,926,544, Cl. 29-703.000.

Kumiai Chemical Industry Co., Ltd.: *See*—
Yamaguchi, Mikio; Suzuki, Chiharu; Matsunari, Kenji; Miyazawa, Takeshige; and Nakamura, Yasuo, 4,927,448, Cl. 71-90.000.

Kummerer, Hans-Helmut, to C. Stiefelmayer KG. End measure, particularly stepped end measure. 4,926,565, Cl. 33-567.000.

Kummli, Paul: *See*—
Moy, Michael E.; Beavers, Kelly J.; Bray, Stuart W.; Goodknight, Frank A.; Kummli, Paul; Kutasy, Eugene; Lucchesi, Raymond L.; Munro, Frederick G.; Sellke, Richard G.; and Studebaker, Thomas J., 4,928,245, Cl. 364-513.000.

Kun, Zoltan K.: *See*—
Leksell, David; Kun, Zoltan K.; and Mandel, Alan F., 4,928,118, Cl. 346-107.00R.

Kundermann, Wolfgang, to Fichtel & Sachs AG. Hydrodynamic clutch. 4,926,988, Cl. 192-3.300.

Kunkle, Albert C.: *See*—
Hyder, Walter J.; Kunkle, Albert C.; and Weaver, Robert M., 4,927,465, Cl. 106-486.000.

Kunz, Peter, to Georg Fischer AG. Apparatus for welding tubular components of thermoplastic material. 4,927,642, Cl. 425-508.000.

Kuraray Company, Ltd.: *See*—
Maeda, Toshihiko; Tokitoh, Yasuo; and Yoshimura, Noriaki, 4,927,960, Cl. 562-512.000.

Kurashima, Ikuo: *See*—
Kaieda, Shozo; Kurashima, Ikuo; Okazima, Hideo; and Mai, Jun, 4,928,055, Cl. 323-300.000.

Kurebayashi, Yutaka: *See*—
Iikubo, Tomohito; and Kurebayashi, Yutaka, 4,927,601, Cl. 420-111.000.

Kureha Chemical Industry Co., Ltd.: *See*—
Hori, Saburo; and Watanabe, Nobuhiro, 4,927,793, Cl. 501-134.000.

Kuriyama, Fumio: *See*—
Okumura, Katsuya; Kuriyama, Fumio; Murai, Yukio; Tsujimura, Manabu; and Sobukawa, Hiroshi, 4,926,648, Cl. 62-55.500.

Kuriyama, Kazunori: *See*—
Kamada, Eiki; Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; and Inoue, Kiyoshi, 4,928,226, Cl. 364-200.000.

Kuroda, Hiroshi; and Watanabe, Atsushi, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Signal receiving method for a user's device in a global positioning system. 4,928,107, Cl. 342-357.000.

Kurohara, Kazuaki: *See*—
Murakawa, Masatake; Bando, Niro; Tone, Masatsugu; Yuki, Mikio; Miyata, Junji; Hayashi, Tetsuaki; and Kurohara, Kazuaki, 4,926,624, Cl. 56-202.000.

Kurosawa, Hinoko; Itoh, Kazuya; Nakamura, Hisashi; and Ishihara, Masamichi, to Hitachi, Ltd. Semiconductor memory. 4,928,281, Cl. 371-51.100.

Kusakawa, Takaji; Wakamoto, Katsuyoshi; and Imaizumi, Mitsuyuki, to Mitsubishi Denki Kabushiki Kaisha; and Kusakawa, Takaji. Method for producing thin plate of phosphor bronze. 4,927,467, Cl. 148-3.000.

Kushibe, Mitsuhiro; Eguchi, Kazuhiro; Funamizu, Masahisa; and Ohba, Yasuo, to Kabushiki Kaisha Toshiba. Impurity-doped semiconductor laser device for single wavelength oscillation. 4,928,285, Cl. 372-45.000.

Kusumoto, Hirotaka; and Shiraki, Toshihiko, to Koyo Seiko Co., Ltd. Release bearing unit. 4,926,993, Cl. 192-98.000.

Kusumoto, Keiji; and Kinoshita, Naoyoshi, to Minolta Camera Kabushiki Kaisha. Image forming apparatus. 4,928,136, Cl. 355-315.000.

Kusunoki, Toshio: *See*—
Ichinomiya, Tsutomu; Kami, Tomohiro; Kitagawa, Fumio; Wada, Sumio; Abe, Hideaki; Ise, Youichi; and Kusunoki, Toshio, 4,926,881, Cl. 128-804.000.

Kutasy, Eugene: *See*—
Moy, Michael E.; Beavers, Kelly J.; Bray, Stuart W.; Goodknight, Frank A.; Kummli, Paul; Kutasy, Eugene; Lucchesi, Raymond L.; Munro, Frederick G.; Sellke, Richard G.; and Studebaker, Thomas J., 4,928,245, Cl. 364-513.000.

Kutner, Andrzej: *See*—
DeLuca, Hector F.; Schnoes, Heinrich K.; Perlman, Kato L.; and Kutner, Andrzej, 4,927,815, Cl. 514-167.000.

Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, to Brother Kogyo Kabushiki Kaisha. Tape cassette and tape printer for use therewith. 4,927,278, Cl. 400-208.000.

Kwok, Kui-Chiu; and Marchand, Bernard J., to Graco Inc. Rotary atomizer. 4,927,081, Cl. 239-223.000.

Kyodo Shiryo Co., Ltd.: *See*—
Hotta, Saburo; Kikuchi, Yoshiaki; Takaya, Masanori; and Inoue, Takashi, 4,927,455, Cl. 71-64.130.

Kyogoku, Tetsuo: *See*—
Okamoto, Hiroshi; Oka Tateki; Sako, Mineyuki; Kyogoku, Tetsuo; and Suzuki, Toshikazu, 4,928,145, Cl. 355-245.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Mizukami, Toru; Katsumata, Ryoichi; and Oka, Tetsuo, 4,927,758, Cl. 435-107.000.

Kysela, Ernst: *See*—
Fest, Christa; Muller, Klaus-Helmut; Pfister, Theodor; Riebel, Hans-Jochem; Kysela, Ernst; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Robert H., 4,927,454, Cl. 71-93.000.

L.G.L. Electronics S.p.A.: *See*—
Zenoni, Pietro, 4,926,912, Cl. 139-452.000.

Laakso, Richard O.: *See*—
Meredith, Michael D.; Phillips, Joseph R.; Laakso, Richard O.; and Stromberg, C. Bertil, 4,927,312, Cl. 414-221.000.

Labeltape Meditect Inc.: *See*—
Snedeker, Marvin L., 4,926,878, Cl. 128-798.000.

Laboratoire L. Lafon: *See*—
Lafon, Louis, 4,927,855, Cl. 514-618.000.

Laboratori Baldacci SpA: *See*—
Caccia, Giulio; and Baldacci, Massimo, 4,927,849, Cl. 514-455.000.

Laboratorios del Dr. Esteve S.A.: *See*—
Corominas, Juan P.; Constansa, Jordi F.; and Pinol, Augusto C., 4,927,926, Cl. 544-101.000.

Lacuve, Jean, to Societe d'Applications Generales d'Electricite et de Mecanique Sagem. Multispectral optical device comprising mirrors. 4,927,256, Cl. 350-619.000.

Lacy, Franklin R. Adjustable windshield and canopy for a boat. 4,926,782, Cl. 114-361.000.

Ladouceur, Bruno: *See*—
Mouesca, Bruno; and Ladouceur, Bruno, 4,928,291, Cl. 376-327.000.

Laesen, Edward: *See*—
Pastrone, John; and Laesen, Edward, 4,927,411, Cl. 604-65.000.

Lafon, Louis, to Laboratoire L. Lafon. Levorotatory isomer of benzhydrylsulfinyl derivatives. 4,927,855, Cl. 514-618.000.

Lagan, Edward F., Jr.: *See*—
Tansky, John L.; Lagan, Edward F., Jr.; and McGarry, Patrick J., 4,928,299, Cl. 379-37.000.

Laine, Jouko: *See*—
Hamala, Sirpa; Heikkila, Matti; Laine, Jouko; Kokkonen, Kari; and Kenakkala, Timo, 4,927,613, Cl. 423-244.000.

Lake, Micheal D.: *See*—
Miskin, Michael; Bamford, William; and Lake, Micheal D., 4,926,553, Cl. 30-49.000.

Lallement, Serge, to Compagnie Des Products Industriels de l'Ouest (C.P.I.O.). Protective bellows particularly for a motor vehicle front wheel drive. 4,927,678, Cl. 428-36.900.

Lam, William Y., to Ethyl Petroleum Additives, Inc. Lubricating oil composition. 4,927,552, Cl. 252-47.000.

Lamb, Mark E.: *See*—
Cozine, Mark L.; Ferguson, David G.; Hansen, Loren F.; and Lamb, Mark E., 4,926,947, Cl. 172-22.000.

Lamb-Weston, Inc.: *See*—
Julian, John C., 4,926,726, Cl. 83-165.000.

Lammle, Harro: *See*—
Gotting, Georg; and Lammle, Harro, 4,926,666, Cl. 72-247.000.

Lampman, David A.; Morich, Michael A; and Danneis, Wayne R., to Picker International, Inc. Automatic eddy current correction. 4,928,063, Cl. 324-307.000.

Lampman, William T.: *See*—
Patera, Ginger E.; Janke, Larry L.; and Lampman, William T., 4,927,033, Cl. 211-41.000.

Lamson, Frederick W., to Lockwood Manufacturing Co. Marker post system. 4,926,785, Cl. 116-209.000.

Lancaster, Gerald M.: *See*—
Strait, Chad A.; Tabor, Ricky L.; and Lancaster, Gerald M., 4,927,888, Cl. 525-285.000.

Lancini, Giancarlo: *See*—
Assi, Francesco; Lancini, Giancarlo; and Gianantonio, Anacleto, 4,927,754, Cl. 435-71.000.

Landman, Ronald G.: *See*—
Burba, Joseph C.; Landman, Ronald G.; Patil, Prabhakar B.; and Reitz, Graydon A., 4,928,227, Cl. 364-424.010.

Landrau, Felix A.: *See*—
Eckenhoff, James B.; Cortese, Richard; and Landrau, Felix A., 4,927,633, Cl. 424-438.000.

Landry, Bernard, to IPL Inc. Device for collecting sap. 4,926,597, Cl. 47-52.000.

Landstrom, D. Karl: *See*—
Christensen, Richard N.; DeVuono, Anthony C.; Wilkinson, William H.; and Landstrom, D. Karl, 4,926,659, Cl. 62-476.000.

Landy, Richard: *See*—
Pilatowicz, Edward A.; Carsello, Anthony; and Landy, Richard, 4,926,556, Cl. 30-216.000.

Lane, Charles D., to Analog Devices, Inc. Parallel analog-to-digital converter using $2^{(n-1)}$ comparators. 4,928,103, Cl. 341-159.000.

Lane, Gregg A.; and Pearlstine, Kathryn, to Du Pont de Nemours, E. I., and Company. Voltammetry in low-permitivity suspensions. 4,928,065, Cl. 324-464.000.

Lane, John H.: *See*—
Kotz, Steven P.; and Lane, John H., 4,927,285, Cl. 403-133.000.

Lane & Roderick, Inc.: *See*—
Bailey, Lowell; and Libbert, Hervey, 4,926,676, Cl. 72-389.000.

Lang, Alfred: *See*—
Durchschlag, Gerald; Lang, Alfred; Rotter, Franz; Fritz, Dieter; and Kopilovitsch, Heinz, 4,927,102, Cl. 246-469.000.

Langer, Horst G., to Dow Chemical Company, The. Process for growing berlinite crystals. 4,927,614, Cl. 423-305.000.

Langhoff, Charles A.: *See*—
Knudsen, Arne K.; Delzer, Scott H.; and Langhoff, Charles A., 4,928,254, Cl. 364-556.000.

Langhorst, Martin A.: *See*—
Stevens, Timothy S.; Langhorst, Martin A.; and Randall, Osro W., III, 4,927,539, Cl. 210-635.000.

Langner, Paul, to Telemus Electronic Systems, Inc. Intrapulse radar receiver. 4,928,105, Cl. 342-192.000.

Lapoiriere, Claudine; Mahieu, Claude; and Papantoniou, Christos, to Societe Anonyme dite: L'Oreal. Process for the preparation of cross-linked poly β-alanine in the form of microspheres. 4,927,883, Cl. 525-154.000.

Laprade, Jean-Paul: *See*—
Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.

Laquerre, Yves, to B. & R. Choiniere Limited. Windrow turning apparatus. 4,926,625, Cl. 56-376.000.

Laraque, Edy: *See*—
Ciloglu, Cavit; Gagne, Martin; Laraque, Edy; Poirier, Joel; Tremblay, Sylvain; and Trudel, Yves, 4,927,461, Cl. 75-254.000.

Larinoff, Michael W. Freeze protected, air-cooled vacuum steam condensers. 4,926,931, Cl. 165-111.000.

Larsen, Lawrence E. Method and apparatus for cardiac hemodynamic monitor. 4,926,868, Cl. 128-653.00R.

Larson, Eric G.: *See*—
Buchanan, Scott; Larson, Eric G.; Pieper, Jon R.; and Boettcher, Thomas E., 4,927,431, Cl. 51-298.000.

Larson, Gary J.: *See*—
Hsu, Jau Y.; and Larson, Gary J., 4,927,662, Cl. 426-658.000.

Larson, John R.: *See*—
Hock, Allan G.; Larson, John R.; and Sousa, John G., 4,928,112, Cl. 346-25.000.

Larson, Steve A.: *See*—
Polk, Gary C.; Larson, Steve A.; and Albrecht, Ronald E., 4,926,904, Cl. 137-565.000.

LaRue, John D.; and LaRue, John D., Jr. Document container. 4,927,074, Cl. 229-125.210.

LaRue, John D., Jr.: *See*—
LaRue, John D.; and LaRue, John D., Jr., 4,927,074, Cl. 229-125.210.

Lasa Industries, Inc.: *See*—
Burns, Douglas H., 4,928,284, Cl. 372-31.000.

Laser Precision Corporation: *See*—
Gentile, John R., 4,928,232, Cl. 364-525.000.

Laserdrive Limited: *See*—
Rees, Theodore D., 4,928,187, Cl. 360-40.000.

Laska, Eugene M.: *See*—
Sunshine, Abraham; and Laska, Eugene M., 4,927,854, Cl. 514-570.000.

Laskaris, Evangelos T.: *See*—
Dorri, Bizhan; and Laskaris, Evangelos T., 4,926,647, Cl. 62-51.100.

Laske, Lawrence L. Adjustable lamp. 4,928,217, Cl. 362-427.000.

Lassmann, Siegfried: *See*—
Muhlratzer, August; Handrick, Karin; Lassmann, Siegfried; and Hirt, Alfred, 4,927,702, Cl. 428-215.000.

Last, James D.: *See*—
Kropielnicki, Jerzy J.; Easter, Brian; and Last, James D., 4,928,108, Cl. 343-704.000.

Latham, Roger A.: *See*—
Motz, Kaye L.; Latham, Roger A.; and Statz, Robert J., 4,926,582, Cl. 44-62.000.

Lathers, Michael W., to Outboard Marine Corporation. Recreational boat seat/sun deck. 4,926,783, Cl. 114-363.000.

Laube, Beth L.: *See*—
Zoltan, Bart J.; Laube, Beth L.; and Adams, George K., III, 4,926,852, Cl. 128-200.230.

Lauffer, Donald K.: *See*—
Porter, Warren W.; and Lauffer, Donald K., 4,928,206, Cl. 361-385.000.

Laurent, Claude; Rostaing, Paul; and Lyobard, Rene, to Rhone-Poulenc Chimie. Process and apparatus using an elastoforming die/-form block comprising low-hardness silicone elastomer. 4,926,673, Cl. 72-465.000.

Lawn Doctor, Inc.: *See*—
Magda, Robert J., 4,926,768, Cl. 111-11.000.

Lawrence, Sharon K. Transparent shielding device for use with autopsy saw. 4,926,882, Cl. 128-850.000.

Lawson, James L., to Torrington Company, The. Equalizing hydrodynamic bearing. 4,927,275, Cl. 384-117.000.

Lawson Randall S.: *See*—
Morris, Arnold M.; D'Zurko, Daphne; Pilsbury, Richard H.; Barkell, J. Warren, Jr.; Orndorff, Karl B.; and Lawson Randall S., 4,926,974, Cl. 187-52.0LC.

Layne, Daniel T., III: *See*—
Antaki, James M.; and Layne, Daniel T., III, 4,927,657, Cl. 426-589.000.

Leader, Matthew J.: *See*—
Kamiya, Tadao; and Leader, Matthew J., 4,927,222, Cl. 350-96.150.

Leak, Gordon D.: *See*—
Biswas, Gautam; Black, David C.; Duncan, Michael G.; Key, Gary R.; Leak, Gordon D.; and Whittington, Robert D., 4,928,306, Cl. 379-201.000.

Leask, John W., to Engineering Dynamics Corporation. Braking system for exercise apparatus. 4,927,136, Cl. 272-69.000.

Leatham, Alan: *See*—
Brooks, Reginald G.; Leatham, Alan; and Coombs, Jeffrey, 4,926,923, Cl. 164-5.000.

Leatherman, Dennis D., to PPG Industries, Inc. Pressure-sensitive multi-part record unit. 4,927,802, Cl. 503-214.000.

Leathman, Alan: *See*—
Brooks, Reginald G.; Leathman, Alan; and Coombs, Jeffrey, 4,926,924, Cl. 164-5.000.

Leaton, Timothy H., to Etablissement Gersan. Feeder. 4,927,004, Cl. 198-704.000.

Lebedik, Grigory L.: *See*—
Komarov, Alexandr N.; Shevtsov, Vitaly T.; Zema, Viktor E.; Lebedik, Grigory L.; Zema, Evgeny M.; Nedorezov, Vladimir A.; Oblovatsky, Anatoly K.; Drozdov, Boris Y.; Zezjulinsky, Andrei A.; Kovalenko, Sergei V.; Litvin, Alexandr N.; Yatsenko, Vladislav P.; and Katunin, Alexandr N., 4,927,121, Cl. 267-47.000.

Leberl, Franz W.; Karspeck, Milan; Johns, Bryan; and Lee, Scott, to Vexcel Corp. Mensuration frame grabbing apparatus. 4,928,169, Cl. 358-93.000.

Lechler, Rolf: *See*—
Heinemann, Joachim; Spies, Karl-Heinz; Keller, Frank; Beicht, Bernd; Leitermann, Wulf; and Lechler, Rolf, 4,926,921, Cl. 160-115.000.

Leckie, James H., to Essex Group, Inc. Protective device of restraining rod produced in continuous casting and rolling process. 4,926,928, Cl. 164-452.000.

Lee, Arnold St. J. System for gathering physiological data. 4,926,866, Cl. 128-630.000.

Lee, Arnold St. J. Method for determining blood pressure. 4,926,874, Cl. 128-682.000.

Lee, Chin-Ching. Disposable ashtray. 4,926,888, Cl. 131-236.000.

Lee, Kung H., to Du Pont de Nemours, E. I., and Company. Manufacture of chloroform. 4,927,981, Cl. 570-255.000.

Lee, Ruby B.: *See*—
Baum, Allen; Bryg, William R.; Mahon, Michael J.; Lee, Ruby B.; and Muchnick, Steven S., 4,928,239, Cl. 364-200.000.

Lee, Scott: *See*—
Leberl, Franz W.; Karspeck, Milan; Johns, Bryan; and Lee, Scott, 4,928,169, Cl. 358-93.000.

Lee, Ving J.; and Curran, William V., to American Cyanamid Company. 7β-(substituted)amino-3-substituted cephalosporanic acids and esters. 4,927,922, Cl. 540-227.000.

Lee, Yanien, to Borden, Inc. Process for making candy coated snack foods such as popcorn. 4,927,645, Cl. 426-93.000.

Leeper, Stephen A.: *See*—
Hatcher, Herbert J.; Gallian, John J.; and Leeper, Stephen A., 4,927,757, Cl. 435-105.000.

Leeson, Paul D.: *See*—
Baker, Raymond; Carling, William R.; James, Kim; and Leeson, Paul D., 4,927,819, Cl. 514-213.000.

Lefevre, Denis: *See*—
Devaux, Francois; Herail, Norbert; Lefevre, Denis; and Lehuede, Jean-Pierre, 4,928,077, Cl. 333-111.000.

Lefevre, Herve ; Bettini, Jean-Pierre; Botti, Serge; and Turpin, Marc, to Thomson-CSF. Multiple-point temperature sensor using optic fibers. 4,928,005, Cl. 250-227.230.

Leger, Kenneth B., to United States of America, Air Force. Modular resistance heater assembly. 4,927,994, Cl. 219-343.000.

Legler, John G.; Folkerth, Harold E.; and Flora, David D., to Shopsmith, Inc. Biscuit joiner. 4,926,916, Cl. 144-136.00R.

Lego M. Lemelshtrich Ltd.: *See*—
Greenberg, Ilan; and Cohen, Amir, 4,927,082, Cl. 239-230.000.

Lehn, Jean-Marie: *See*—
Mathis, Gerard; and Lehn, Jean-Marie, 4,927,923, Cl. 540-456.000.

Lehuede, Jean-Pierre: *See*—
Devaux, Francois; Herail, Norbert; Lefevre, Denis; and Lehuede, Jean-Pierre, 4,928,077, Cl. 333-111.000.

Leibovich, Gregory, to Hydraulic Units, Inc. Proportional permanent magnet force actuator. 4,928,028, Cl. 310-23.000.

Leigh, James P.; and Roethel, Henry G., to Meyer Company, The. Dispensing valve with elastic sealing tube. 4,927,061, Cl. 222-212.000.

Leinert, Herbert; Tsaklakidis, Christos; and Sponer, Gisbert, to Boehringer Mannheim GmbH. 1,2-diamino compounds, processes for their preparation and pharmaceutical compositions containing them. 4,927,834, Cl. 514-422.000.

Leis, Michael D., to Digital Equipment Corporation. Multiple bandwidth filter system for phase locked loop. 4,928,075, Cl. 331-17.000.

Leischner, Hasso: *See*—
Wuest, Willi; Eskuchen, Rainer; Esser, Herbert; and Leischner, Hasso, 4,927,946, Cl. 549-371.000.

Leising, Maurice B.: *See*—
Mehta, Hemang S.; Holbrook, Gerald L.; and Leising, Maurice B., 4,928,235, Cl. 364-424.100.

Leitermann, Wulf: *See*—
Heinemann, Joachim; Spies, Karl-Heinz; Keller, Frank; Beicht, Bernd; Leitermann, Wulf; and Lechler, Rolf, 4,926,921, Cl. 160-115.000.

Lekaell, David; Kun, Zoltan K.; and Mandel, Alan F., to Westinghouse Electric Corp. Enhanced resolution electrophotographic-type imaging station. 4,928,118, Cl. 346-107.00R.

Leland Stanford California Corporation, Board of Trustees of the: *See*—
Swanson, Richard M., 4,927,770, Cl. 437-2.000.

Leland Stanford Junior University, The Board of Trustees of the: *See*—
Keith, Douglas L., 4,927,515, Cl. 204-298.210.
Kino, Gordon S.; and Xiao, Guoqing, 4,927,254, Cl. 350-507.000.

Lemaire, Denis J., to Wenger SA. Pocket knife. 4,926,555, Cl. 30-162.000.

Lemons, George D.: *See*—
Ungchusri, Tep; and Lemons, George D., 4,927,192, Cl. 285-305.000.

Lenker, Don H.: *See*—
Butler, Lee D.; Orlando, Franklin P.; and Lenker, Don H., 4,927,440, Cl. 56-12.800.

Lennox Industries, Inc.: *See*—
Olsen, Mark W.; and Winegardner, John B., 4,926,658, Cl. 62-324.100.

Lenz, Ruediger: *See*—
Merrem, Hans-Joachim; Buhr, Gerhard; and Lenz, Ruediger, 4,927,732, Cl. 430-191.000.

Leonard, Patrick F.; Svetkoff, Donald J.; Kelley, Robert W.; Rohrer, Donald K.; and Coleman, E. North, Jr., to Synthetic Vision Systems, Inc. Method and system for automatically visually inspecting an article. 4,928,313, Cl. 382-8.000.

Leonardo, Victoria A.; and Nelson, Leonard E., to Motorola, Inc. Paging terminal apparatus with message storage and retransmission capability and method therefor. 4,928,096, Cl. 340-825.440.

Leopold, Arthur B., to Tarel Seven Design, Inc. Grooming device. 4,926,796, Cl. 119-83.000.

Leroux, Andre-Jean; and Mercier, Claude, to Mercier, Claude, a part interest. Method and device for manufacturing charcoal. 4,926,763, Cl. 110-215.000.

Lesk, Israel A.; Thomas, Ronald E.; Hawkins, George W.; and Rugg, James M., to Motorola, Inc. Die corner design having topological configurations. 4,928,162, Cl. 357-72.000.

Leszczak, John, to Bates Manufacturing Company, The. Stapling machine. 4,927,067, Cl. 227-128.000.

Lethen, Theodore H.: *See*—
Yerkes, James E.; and Lethen, Theodore H., 4,928,257, Cl. 364-563.000.

Leuenberger, Hans, to Bisc Holding AG. Method of and apparatus for removing stains from soiled areas of a plannar textile article. 4,926,514, Cl. 8-150.000.

Leupold, Herbert A., to United States of America, Army. Method of mass producing superconducting persistent current rings. 4,928,081, Cl. 335-216.000.

Levatter, Jeffrey I., to Acculase Inc. Liquid filled flexible distal tip light guide. 4,927,231, Cl. 350-96.320.

Leveque, Alain; and Triollier, Michel, to Rhone-Poulenc Industries. Recovery of gallium/rare earth values from oxide mixtures thereof. 4,927,609, Cl. 423-21.500.

Lever Brothers Company: *See*—
Beute, Willem, 4,927,027, Cl. 206-611.000.
Duckworth, Ralph M., 4,927,625, Cl. 424-52.000.
Haring, Petrus G. M., 4,927,652, Cl. 426-330.600.
Schwarz, Joshua; and Accardi, Christine, 4,927,559, Cl. 252-186.390.

Levine-Umans, Margaret P.: *See*—
Vitsky, Sally J.; and Levine-Umans, Margaret P., 4,926,759, Cl. 108-111.000.

Levinson, Frank H., to Finisar Corporation. 2×2 Optical bypass switch. 4,927,225, Cl. 350-96.180.

Lewers, William R.: *See*—
Bulso, Joseph D., Jr.; and Lewers, William R., 4,926,724, Cl. 83-35.000.

Lewis, Adrian: *See*—
Eglise, David; and Lewis, Adrian, 4,926,996, Cl. 194-212.000.

Lewis, John A., Jr.: *See*—
Haber, Terry M.; Smedley, William H.; Foster, Clark B.; and Lewis, John A., Jr., 4,927,019, Cl. 206-365.000.

Leybold Aktiengesellschaft: *See*—
Schultheiss, Eberhard; and Wirz, Peter, 4,927,513, Cl. 204-192.130.

Lhymn, Chang: *See*—
Lhymn, Yoon O.; and Lhymn, Chang, 4,927,712, Cl. 428-614.000.

Lhymn, Yoon O.; and Lhymn, Chang, to Yoon Technology. Fusible core alloy composites for plastics molding. 4,927,712, Cl. 428-614.000.

Li, Bean T.: *See*—
Tsai, Chong S.; Chen, Shou H.; Li, Bean T.; and Jean, King L., 4,927,664, Cl. 427-57.000.

Li, Qin Z.: *See*—
Ma, Bao P.; Shou-Fu, Zhong; and Li, Qin Z., 4,926,742, Cl. 89-33.020.

Liao, Shyh-Yuan: *See*—
Barnett, Ronald E.; Dikeman, Roxane; Liao, Shyh-Yuan; Gill, John; and Pantaleone, David P., 4,927,654, Cl. 426-548.000.

Libbert, Hervey: *See*—
Bailey, Lowell; and Libbert, Hervey, 4,926,676, Cl. 72-389.000.

Lichka, Helmut J., to Technolizenz Establishment. System of safety tank elements preventing explosions. 4,927,045, Cl. 220-88.00R.

Lidseen of North Carolina, Inc.: *See*—
Swanson, Melvin E., 4,926,672, Cl. 72-458.000.

Liebeschuetz, John W.: *See*—
Carson, Chrislyn M.; Copping, Leonard G.; Ehr, Robert J.; Gitlitz, Melvin H.; McNeil, Maynard W.; Street, Peter F. S.; and Liebeschuetz, John W., 4,927,812, Cl. 514-63.000.

Liere, Horst: *See*—
Brennecke, Hermann; Liere, Horst; and Koch, Reinhold, 4,928,255, Cl. 364-558.000.

Lierman, W. O. Game. 4,927,158, Cl. 273-268.000.

Lilly, Carol E. H.; Moore, Loyd C.; Eike, Mark E.; and Barker, Nicholas E., to Lilly, Carol E. H. Playtray with hinged legs. 4,926,758, Cl. 108-43.000.

Lin, Chen-Ju. Safety sinker. 4,926,580, Cl. 43-44.890.

Lin, Jiang-Jen: *See*—
Speranza, George P.; Lin, Jiang-Jen; and Templeton, James H., 4,927,912, Cl. 528-405.000.

Lind, Paul U., to Siemens Transmission Systems, Inc. Non-intrusive fiber optic electromagnetic field probe apparatus and associated methods. 4,928,067, Cl. 324-96.000.

Lindel, Hans; and Hallenbach, Werner, to Bayer Aktiengesellschaft. Halogen substituted pyridylalkyl ketones. 4,927,938, Cl. 546-315.000.

Lindenstruth, Werner: *See*—
Bohnstedt, Werner; and Lindenstruth, Werner, 4,927,722, Cl. 429-147.000.

Lindley, John E. Sealing collar for a resuscitator or respirator. 4,926,844, Cl. 128-30.000.

Lindsay, Frederick E.: *See*—
Eisenberg, Eugene; Lindsay, Frederick E.; Evans, James J.; and Collins, Ronald H., 4,926,801, Cl. 123-41.840.

Lindsey Completion Systems, Inc.: *See*—
Lindsey, Hiram E., Jr., 4,926,938, Cl. 166-208.000.

Lindsey, Hiram E., Jr., to Lindsey Completion Systems, Inc. Rotatable liner hanger with multiple bearings and cones. 4,926,938, Cl. 166-208.000.

Lingnau, Juergen: *See*—
Vicari, Richard; Aslam, Mohammad; Ray, Wilson B.; Davenport, Kenneth G.; Dammel, Ralph; Lingnau, Juergen; and Doessel, Karl-Friedrich, 4,927,956, Cl. 560-130.000.

Linnig, Karl-Heinz. Electromagnetically operable friction-disk clutch. 4,926,992, Cl. 192-48.200.

Linyaev, Eugene J.; and Swanson, Roy E., Jr., to Western Atlas International, Inc. Pressure/temperature compensated transducer pad assembly. 4,928,031, Cl. 310-346.000.

Liposome Technology, Inc.: *See*—
Huang, Anthony H.; and Krishnan, Satya, 4,927,571, Cl. 264-4.300.
Morano, Jacqueline K.; Martin, Francis J.; and Woodle, Martin, 4,927,637, Cl. 424-450.000.

Lisiecki, Robert E., to Pure-Pak, Inc. Multi-piece flat top container. 4,927,075, Cl. 229-125.340.

Liska, Paul: *See*—
Gratzel, Michael; and Liska, Paul, 4,927,721, Cl. 429-111.000.

Lisle Corporation: *See*—
Pool, James L., 4,926,537, Cl. 29-275.000.

Listinsky, Jay J.: *See*—
Bryant, Robert G.; and Listinsky, Jay J., 4,927,624, Cl. 424-9.000.
Littlebury, Hugh: *See*—
Corley, Dean; and Littlebury, Hugh, 4,928,002, Cl. 235-479.000.
Litvin, Alexandr N.: *See*—
Komarov, Alexandr N.; Shevtsov, Vitaly T.; Zema, Viktor E.; Lebedik, Grigory L.; Zema, Evgeny M.; Nedorezov, Vladimir A.; Oblovatsky, Anatoly K.; Drozdov, Boris Y.; Zezjulinsky, Andrei A.; Kovalenko, Sergei V.; Litvin, Alexandr N.; Yatsenko, Vladislav P.; and Katunin, Alexandr N., 4,927,121, Cl. 267-47.000.
Liu, Geng-tao: *See*—
Yang, Ming-he; Chen, Yan-rong; Liu, Geng-tao; and Huang, Liang, 4,927,937, Cl. 546-296.000.
Liu, Kou-Chang, to GAF Chemicals Corporation. Process for preparing 2,3-bis(hydroxyethoxymethyl) bicyclo [2,2,1] heptane and polyester therewith. 4,927,976, Cl. 568-665.000.
Liverman, Robert B.: *See*—
Bealkowski, Richard; Dayan, Richard A.; Doria, David J.; Kinnear, Scott G.; Krantz, Jeffrey I.; Liverman, Robert B.; Sotomayor, Guy G.; Williams, Donald D.; and Vaiskauckas, Gary A., 4,928,237, Cl. 364-200.000.
Livne, Mordechai: *See*—
Zilberman, Moshe; Livne, Mordechai; Tchetchick, Doron; and Daniel, Moshe, 4,926,684, Cl. 73-147.000.
Lloyd, Paul M. J. M. T. Tray for a baby's chair. 4,927,024, Cl. 206-562.000.
L'Nard Associates, Inc.: *See*—
Lonardo, Robert, 4,926,884, Cl. 128-892.000.
Lobsinger, Ralph J.: *See*—
Johnson, Gerald D.; Lobsinger, Ralph J.; Hamilton, Margaret L.; and Gelles, David S., 4,927,468, Cl. 148-3.000.
Lock, Willem, to U.S. Philips Corporation. Adjustable support table for medical use. 4,927,127, Cl. 269-322.000.
Lockheed Missiles & Space Company, Inc.: *See*—
Wade, William D., 4,926,910, Cl. 139-425.00R.
Lockwood Manufacturing Co.: *See*—
Lamson, Frederick W., 4,926,785, Cl. 116-209.000.
Loctite Corporation: *See*—
Gelinas, William A.; Holtz, Edwin R.; Argazzi, Dennis J.; Smigel, Robert L.; and Wiley, Dan W., 4,927,487, Cl. 156-351.000.
Loggins, C. J., to Mayline Company, Inc. Triangular drafting instrument. 4,926,564, Cl. 33-474.000.
Login, Robert B.: *See*—
Shih, Jenn S.; Smith, Terry E.; and Login, Robert B., 4,927,667, Cl. 427-154.000.
Logsdon, William K.: *See*—
DuRand, Elden E., III; and Logsdon, William K., 4,928,085, Cl. 340-544.000.
Lohmann GmbH & Co. KG: *See*—
Fohst, Manfred, 4,926,570, Cl. 36-43.000.
Lonardo, Robert, to L'Nard Associates, Inc. Method and means for preventing skin abrasions for patients having legs substantially locked in juxtaposition. 4,926,884, Cl. 128-892.000.
Long, David M., Jr., to Alliance Pharmaceutical Corp. Dissolution of gas in a fluorocarbon liquid. 4,927,623, Cl. 424-5.000.
Long-Lok Fasteners Corporation: *See*—
Fitzgerald, Walter P.; Sanders, Beatrix Y.; and Bagheri, Mansour A. H., 4,927,307, Cl. 411-302.000.
Longman, Robert J.: *See*—
Pettigrew, Robert M.; Humberstone, Victor C.; Gardner, Keith; Longman, Robert J.; and Helfet, Peter R., 4,928,132, Cl. 346-135.100.
Lonsberry, Kenneth F., to Permco, Inc. Lubrication of gear pump trunnions. 4,927,343, Cl. 418-102.000.
Lopez, Ralph: *See*—
Podlesny, Daniel B.; and Lopez, Ralph, 4,926,519, Cl. 15-235.400.
L'Oreal: *See*—
Gueret, Jean-Louis, 4,927,281, Cl. 401-129.000.
Morane, Bruno; and Joulia, Gerard, 4,927,282, Cl. 401-129.000.
Lorenz, Dieter, to Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V. System for measuring electromagnetic radiation originating from the hemisphere. 4,928,012, Cl. 250-338.100.
Lorenz, Robert G.: *See*—
Ashjaee, Javad; Helkey, Roger J.; Lorenz, Robert G.; and Sutherland, Robert A., 4,928,106, Cl. 342-352.000.
Lorenzen, Heinz-Christen; Heitmann, Uwe; Siems, Wolfgang; and Pinck, Peter, to Korber AG. Method of and apparatus for making a trimmed stream of tobacco fibers or the like. 4,926,886, Cl. 131-84.400.
Loschiavo, Samuel R., to Canadian Patents & Development Ltd. Device for controlling stored food insects. 4,927,635, Cl. 424-409.000.
Lothammer, Henry, to Ralph Earl Co., Inc. Machine tool auxiliary function hydraulic system. 4,926,723, Cl. 82-118.000.
Lott, Gloria Y.; Britton, Scott M.; and Constantine, Barry E., to Sherwood Medical Company. Wound dressing. 4,926,850, Cl. 128-155.000.
Lottiau, Michel; Glemet, Michel; Cognet, Gilles; and Causier, Alain, to Atochem. Process for the manufacture of polyamide composite material reinforced with long fibers. 4,927,583, Cl. 264-136.000.
Lotzsch, Detlef: *See*—
Bahr, Christian; Heppke, Gerd; Lotzsch, Detlef; Dubal, Hans-Rolf; Escher, Claus; and Ohlendorf, Dieter, 4,927,244, Cl. 350-350.00S.
Loutan, Dominique: *See*—
Geng, Markus; and Loutan, Dominique, 4,927,035, Cl. 213-77.000.
Lovett, Donna M.: *See*—
Lovett, Robert R.; and Lovett, Donna M., 4,927,995, Cl. 219-385.000.
Lovett, Robert R.; and Lovett, Donna M. Enclosed towel warmer. 4,927,995, Cl. 219-385.000.
Lovik, Craig J. Balloon sculpturing methods, apparatus and products. 4,927,400, Cl. 446-220.000.
Lozier, Antony J., to Zimmer, Inc. Surgical rod pusher instrument. 4,927,425, Cl. 606-99.000.
Lu, Nicky C.: *See*—
Dhong, Sang H.; Lu, Nicky C.; and Henkels, Walter H., 4,927,779, Cl. 428-52.000.
Lubrizol Corporation, The: *See*—
Jolley, Scott T.; and Salomon, Mary F., 4,927,554, Cl. 252-68.000.
Lucas Industries, Public Limited Company: *See*—
Harrison, Anthony W.; and Taft, Philip A., 4,927,212, Cl. 303-115.000.
Lucas, Raymond, to Bobst SA. Device for stacking batches of flat objects in a vertical file. 4,927,321, Cl. 414-788.900.
Lucchesi, Raymond L.: *See*—
Moy, Michael E.; Beavers, Kelly J.; Bray, Stuart W.; Goodknight, Frank A.; Kummli, Paul; Kutasy, Eugene; Lucchesi, Raymond L.; Munro, Frederick G.; Sellke, Richard G.; and Studebaker, Thomas J., 4,928,245, Cl. 364-513.000.
Luckman, Thomas, to Johnson & Johnson Orthopaedics, Inc. Surgical cutting block. 4,926,847, Cl. 606-88.000.
Lukich, Lewis T.: *See*—
Demor, Edward J., III; Hinkel, Walter W.; and Lukich, Lewis T., 4,926,918, Cl. 152-154.000.
Lustwerk, Ferdinand. Magnetically driven pump. 4,927,337, Cl. 417-420.000.
Lutz, William R.; Verschueren, Wim G.; Fischer, Hanspeter; and Van Lommen, Guy R. E., to Janssen Pharmaceutica N.V. Tricyclic 1H-imidazole-5-carboxylic acid derivatives as herbicides. 4,927,449, Cl. 71-90.000.
Lyman, George; and Mathus, Gregory, to Costar Corporation. Tissue culture flask. 4,927,764, Cl. 435-296.000.
Lyman, George: *See*—
Mathus, Gregory; and Lyman, George, 4,927,604, Cl. 422-101.000.
Lynn, Dwight D., to ACS Communications. Time dependent, variable amplitude threshold output circuit for frequency variant and frequency invariant signal discrimination. 4,928,307, Cl. 379-395.000.
Lynn, William R.; and Belanger, Roger R. Improved mopping system. 4,926,515, Cl. 15-4.000.
Lyobard, Rene: *See*—
Laurent, Claude; Rostaing, Paul; and Lyobard, Rene, 4,926,673, Cl. 72-465.000.
Lyons, Patrick J.: *See*—
Abbott, Kenneth E.; Lyons, Patrick J.; and Satariano, Richard M., 4,926,589, Cl. 51-427.000.
M-B-W Inc.: *See*—
Artzberger, Thomas G., 4,927,289, Cl. 404-117.000.
Ma, Bao P.; Shou-Fu, Zhong; and Li, Qin Z., to Poly Technologies, Inc. Spiral drum magazine with elongated magazine clip and single piece last round follower. 4,926,742, Cl. 89-33.020.
Mabry, Ray W.: *See*—
Hamilton, Frank S.; Ouzts, Johnny D.; and Mabry, Ray W., 4,926,795, Cl. 119-3.000.
Macauley, Edward C.: *See*—
Boyer, Ralph C.; and Macauley, Edward C., 4,927,154, Cl. 273-200.00R.
Maciulaitis, Algirdas: *See*—
Foreman, Kenneth M.; and Maciulaitis, Algirdas, 4,928,286, Cl. 372-90.000.
Mack Trucks, Inc.: *See*—
Eisenberg, Eugene; Lindsay, Frederick E.; Evans, James J.; and Collins, Ronald H., 4,926,801, Cl. 123-41.840.
MacKenthun, Holger: *See*—
Kreft, Hans-Diedrich; MacKenthun, Holger; and Hass, Wolfgang, 4,928,087, Cl. 340-825.710.
MacMaster, George H.; and Nichols, Lawrence J., to Raytheon Company. Low-noise crossed-field amplifier. 4,928,070, Cl. 330-43.000.
Macomber, Steven H.: *See*—
de Groot, Peter J.; Macomber, Steven H.; and Gallatin, Gregg M., 4,927,263, Cl. 356-5.000.
Madill, E. Gaylord, to H.V.T. Technology Ltd. Multiple gear-ratio automatic transmission. 4,926,713, Cl. 475-146.000.
Maeda, Kiyoto: *See*—
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; Inoue, Satoru; Sugano, Masayo; and Tanako, Hirotaka, 4,927,827, Cl. 514-256.000.
Maeda, Toshihiko; Tokitoh, Yasuo; and Yoshimura, Noriaki, to Kuraray Company, Ltd. Phosphonium salts and processes for production of and uses for the same. 4,927,960, Cl. 562-512.000.
Maeda, Yutaka, to Minolta Camera Kabushiki Kaisha. Cutting device for cutting strip of recording medium. 4,926,727, Cl. 83-203.000.
Maejima, Kimiko: *See*—
Yamauchi, Junichi; Maejima, Kimiko; Eguchi, Kaoru; and Kabuyama, Noriko, 4,928,253, Cl. 364-521.000.
Maekawa, Motoyuki: *See*—
Imoto, Koji; Omura, Tadao; Kataoka, Yoichi; Nakajima, Kunihiko; Maekawa, Motoyuki; Tamura, Hiroki; and Shioya, Yoshiaki, 4,926,817, Cl. 123-292.000.
Maes, Felix V.; and Baikrich, Michel, to ARSOC S.P.R.L. Mounting device adaptable on a weapon. 4,926,576, Cl. 42-101.000.

Magda, Robert J., to Lawn Doctor, Inc. Seed spreader. 4,926,768, Cl. 111-11.000.

Magnani, Francesco; and Minardi, Paolo, to Societa' Cavi Pirelli S.p.A. Method and equipment for laying an elongated element underground. 4,927,294, Cl. 405-177.000.

Magnin, Paul A.: *See*—
Hunt, Barry F.; D'Sa, Alwyn P.; and Magnin, Paul A., 4,928,231, Cl. 364-518.000.

Magnotta, Frank A.: *See*—
Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.

Maguire, Mark A.: *See*—
Dake, Michael D.; and Maguire, Mark A., 4,927,418, Cl. 604-264.000.

Mahieu, Claude: *See*—
Lapoiriere, Claudine; Mahieu, Claude; and Papantoniou, Christos, 4,927,883, Cl. 525-154.000.

Mahler, Jacques: *See*—
Soszka, Barbara; Federowsky, Robert; and Mahler, Jacques, 4,927,445, Cl. 65-11.100.

Mahmud, Meftah U., to Nashua Corporation. Double crosslinked barrier coating. 4,927,801, Cl. 503-200.000.

Mahon, Michael J.: *See*—
Baum, Allen; Bryg, William R.; Mahon, Michael J.; Lee, Ruby B.; and Muchnick, Steven S., 4,928,239, Cl. 364-200.000.

Mahoney, Robert D.: *See*—
Beck, Henry N.; and Mahoney, Robert D., 4,927,535, Cl. 210-500.230.

Mai, Jun: *See*—
Kaieda, Shozo; Kurashima, Ikuo; Okazima, Hideo; and Mai, Jun, 4,928,055, Cl. 323-300.000.

Maier, Bernhard: *See*—
Friehmelt, Volker; Maier, Bernhard; Kohling, Alfons; and Schmitt, Rolf-Eberhard, 4,927,511, Cl. 204-151.000.

Maijer, Rolf: *See*—
Smith, Dennis C.; and Maijer, Rolf, 4,927,361, Cl. 433-9.000.

Main, William E., to Motorola Inc. FM demodulator. 4,928,068, Cl. 329-324.000.

Major Lock Supply Inc.: *See*—
Deforrest, William, Sr., 4,926,670, Cl. 70-374.000.

Makihara, Nobuo; and Tahara, Hideo, to Nissan Motor Co., Ltd. Air supply apparatus for outboard motor. 4,927,392, Cl. 440-88.000.

Makino, Hideaki: *See*—
Anzai, Hisao; Makino, Hideaki; Ootani, Masami; Sasaki, Isao; and Nishida, Kozi, 4,927,893, Cl. 525-378.000.

Malamas, Michael S., to American Home Products. Spiro-isoquinoline-pyrrolidine tetrones and analogs thereof useful as aldose reductase inhibitors. 4,927,831, Cl. 514-278.000.

Malay, Manuel R.: *See*—
Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., 4,927,720, Cl. 429-54.000.

Male, Alan T.: *See*—
Iyer, Natraj C.; Carr, Walter J., Jr.; and Male, Alan T., 4,927,985, Cl. 174-125.100.

Male, Andrew J.; and Carrodus, Melvin A., to Westinghouse Electric Corp. Circuit breaker auxiliary switch assembly. 4,928,079, Cl. 335-13.000.

Mallinckrodt Inc.: *See*—
Cantrell, Gary L., 4,927,980, Cl. 568-937.000.
Dolfini, Joseph E.; Glinka, Jerome; and Bosch, Andrew C., 4,927,805, Cl. 512-27.000.

Malluck, John F.: *See*—
Bessel, William H., III; Gladden, Robert H., Jr.; Malluck, John F.; Ross, Robert R.; and Williamson, Andrew H., Jr., 4,927,227, Cl. 350-96.200.

Malmborg, Bengt, to Aktiebolaget Leo. Connector and a disposable assembly utilizing said connector. 4,927,423, Cl. 604-88.000.

MAN Gutehoffnungshutte, GmbH: *See*—
Buthmann, Peter; and Kotzur, Joachim, 4,926,642, Cl. 60-607.000.

Man Technologie AG: *See*—
Muhlratzer, August; Handrick, Karin; Lassmann, Siegfried; and Hirt, Alfred, 4,927,702, Cl. 428-215.000.

Manabe, Seiichiro; and Nagashima, Yukihito, to Nippon Sheet Glass Co., Ltd. Glass melting furnace. 4,927,446, Cl. 65-347.000.

Mandel, Alan F.: *See*—
Leksell, David; Kun, Zoltan K.; and Mandel, Alan F., 4,928,118, Cl. 346-107.00R.

Maneuf, Serge: *See*—
Barthelemy, Alain; Maneuf, Serge; and Froehly, Claude, 4,928,282, Cl. 372-18.000.

Mankus, John R.: *See*—
Eckler, Donald F.; Mankus, John R.; Ripp, Francis J.; and Saxenmeyer Jr., George J., 4,927,387, Cl. 439-499.000.

Mannesmann Rexroth GmbH: *See*—
Fischer, Horst; and Staub, Karl, 4,927,332, Cl. 417-299.000.

Manning, Randy M.: *See*—
Hopkins, John R.; Manning, Randy M.; and Marusak, Stephen A., 4,926,548, Cl. 29-860.000.

Manor, Yehuda. High performance sea-going craft. 4,926,773, Cl. 114-61.000.

Manostat Corporation: *See*—
Gomes, Francis, 4,926,717, Cl. 81-3.200.

Manvell, Clive, to CMB Packaging (UK) Limited. Sterilized foodstuff preparation. 4,927,653, Cl. 426-399.000.

Manville Corporation: *See*—
Jade, Sivananda S., 4,927,622, Cl. 423-608.000.

Manwaring, Kim H.: *See*—
Newkirk, John B.; and Manwaring, Kim H., 4,927,420, Cl. 606-45.000.

Marathon Electric Mfg. Corp.: *See*—
Nolte, Duane R., 4,927,988, Cl. 200-80.00R.

Marcantonio, Paul J., to Chevron Research Company. Leaching cobalt, molybdenum, nickel, and vanadium from spent hydroprocessing catalysts. 4,927,794, Cl. 502-26.000.

Marchand, Bernard J.: *See*—
Kwok, Kui-Chiu; and Marchand, Bernard J., 4,927,081, Cl. 239-223.000.

Markiewicz, James E.; and Shrontz, Darrell G., to Precision Extruded Products, Inc. Method of sizing and straightening extruded tubes. 4,926,667, Cl. 72-256.000.

Markiewicz, Stan J., to Du pont Canada Inc. Gas barrier structures. 4,927,689, Cl. 428-34.800.

Markley, Lowell D.: *See*—
Kirby, Neil V.; Street, Peter F. S.; and Markley, Lowell D., 4,927,833, Cl. 514-399.000.

Marlett, Everett M., to Ethyl Corporation. Preparation of silane and amine alanes. 4,927,616, Cl. 423-347.000.

Mars Incorporated: *See*—
Eglise, David; and Lewis, Adrian, 4,926,996, Cl. 194-212.000.
Tansky, John L.; Lagan, Edward F., Jr.; and McGarry, Patrick J., 4,928,299, Cl. 379-37.000.

Marshall, Gerald M.; Hull, Raymond, Jr.; and Farrington, Allan P., to Chicopee. Transverse webber and stratified webs formed therewith. 4,927,685, Cl. 428-74.000.

Marshall, Steven P., to Texas Instruments Incorporated. Improved output buffer having reduced noise characteristics. 4,928,023, Cl. 307-443.000.

Marshall and Williams Company: *See*—
Hosmer, Christopher E.; and Whaley, John F., 4,926,529, Cl. 26-89.000.

Marsoner, Hermann: *See*—
Fischer, Fritz; Kleinhappl, Erich; and Marsoner, Hermann, 4,927,603, Cl. 422-67.000.

Martens, Phillip A.: *See*—
Nelson, Norvell J.; and Martens, Phillip A., 4,927,700, Cl. 428-209.000.

Marthaler, Gregory A.: *See*—
Marthaler, Robert H.; and Marthaler, Gregory A., 4,927,052, Cl. 221-64.000.

Marthaler, Robert H.; and Marthaler, Gregory A. Golf ball package, holder and dispenser. 4,927,052, Cl. 221-64.000.

Martin, Charles K., to Infern-O-Therm. Waste oil purifying apparatus. 4,927,500, Cl. 196-46.000.

Martin, Charles L.: *See*—
Martin, Wayne C., 4,926,554, Cl. 30-161.000.

Martin, Emilio B., to AMPER, S.A. Document sorter for reader/-printer equipment. 4,927,031, Cl. 209-657.000.

Martin Engineering Company: *See*—
Swinderman, Robert T.; and Mueller, David W., 4,927,003, Cl. 198-497.000.

Martin, Francis J.: *See*—
Morano, Jacqueline K.; Martin, Francis J.; and Woodle, Martin, 4,927,637, Cl. 424-450.000.

Martin, Francis W.: *See*—
Francis, Gaylord L.; and Martin, Francis W., 4,927,711, Cl. 428-432.000.

Martin, Kenneth W.; and McClure, Jonathan T. Protective laboratory specimen bag. 4,927,405, Cl. 493-194.000.

Martin-Lopez, Fernando, to Seagate Technology, Inc. Switch mode electrical power controller. 4,928,054, Cl. 323-288.000.

Martin, Peter: *See*—
Wenger, Hartmut; Martin, Peter; Rotzinger, Hans; and Denz, Martin, 4,926,789, Cl. 118-668.000.

Martin, Robert N.: *See*—
Sells, Charles C.; and Martin, Robert N., 4,926,838, Cl. 126-25.00A.

Martin, Wayne C., to Martin, Charles L. Collapsible knife. 4,926,554, Cl. 30-161.000.

Martinez, George, Jr. Method and apparatus for saving energy in an air conditioning system. 4,926,649, Cl. 62-99.000.

Martinez, Louis, to Cooper Industries, Inc. Two-way data broadcast networks. 4,928,177, Cl. 358-142.000.

Martinez, Santiago. Auxiliary rear view mirror assembly. 4,927,255, Cl. 350-616.000.

Martyak, Nicholas M., to Atochem North America, Inc. High-performance electrodeposited chromium layers formed at high current efficiencies. 4,927,506, Cl. 204-51.000.

Marum, John R., to TRW Inc. Redundancy interconnection circuitry. 4,928,022, Cl. 307-241.000.

Marumoto, Katsuji: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.

Marusak, Stephen A.: *See*—
Hopkins, John R.; Manning, Randy M.; and Marusak, Stephen A., 4,926,548, Cl. 29-860.000.

Maruyama, Hidekazu, to Ikeda Bussan Co., Ltd. Trim cover for use with seats in vehicles. 4,927,209, Cl. 297-180.000.

Maruzen Petrochemical Co., Ltd.: *See*—
Hayashida, Suetou; Kimura, Kyoichiro; and Takahashi, Eiji, 4,927,885, Cl. 525-211.000.
Yamagishi, Takanori; Idai, Tsutomu; and Takahashi, Eiji, 4,927,979, Cl. 568-791.000.

Marzalek, Michael S.; Peterson, Stephen R.; and Wendler, John A., to Hewlett-Packard Company. Method and apparatus for waveform reconstruction for sampled data system. 4,928,251, Cl. 364-484.000.

Masada, Shigeo, to Mitsubishi Denki Kabushiki Kaisha. Secret information preserving system for a multiple issuer IC card. 4,928,001, Cl. 235-380.000.

Masaki, Hisashi, to Casio Computer Co., Ltd. Method of bonding IC unit. 4,927,491, Cl. 156-630.000.

Masaki, Ryoichi: *See*—
Kawabata, Kenji; Ogawa, Soichiro; and Masaki, Ryoichi, 4,928,037, Cl. 315-127.000.

Masao, Kubodera: *See*—
Kazuo, Inoue; Noriyuki, Kishi; Masao, Kubodera; Eitetsu, Akiyama; Shigeto, Kashiwabara; and Osamu, Takizawa, 4,926,640, Cl. 60-602.000.

Masco Corporation of Indiana: *See*—
Bahroos, Gobind; and Jonte, Patrick B., 4,927,115, Cl. 251-241.000.

Mase, Akira: *See*—
Yamazaki, Shunpei; Mase, Akira; and Sakayori, Hiroyuki, 4,927,493, Cl. 156-643.000.

Masina, Franca: *See*—
Cantatore, Giuseppe; Borzatta, Valerio; and Masina, Franca, 4,927,930, Cl. 544-198.000.

Maska, Rüdolf; and Essary, William A., to PPG Industries, Inc. Method for preparing acrylic/polyester resin. 4,927,875, Cl. 524-457.000.

Massachusetts Institute of Technology: *See*—
Haritonidis, Joseph H.; Senturia, Stephen D.; Warkentin, David J.; and Mehregany, Mehran, 4,926,696, Cl. 73-205.000.
Wurtman, Richard J., 4,927,853, Cl. 514-567.000.

Masuda, Masaaki; Kotani, Masanori; Wakahara, Katsuhiro; and Sakata, Shuichi, to Sharp Kabushiki Kaisha. Multi-room type air-conditioning equipment. 4,926,653, Cl. 62-204.000.

Masuda, Taizo: *See*—
Tanaka, Koji; Ueda, Minoru; and Masuda, Taizo, 4,927,710, Cl. 428-394.000.

Masuzawa, Yukikazu, to Kabushiki Kaisha Toshiba. Apparatus for detecting position of moving object. 4,928,091, Cl. 340-686.000.

Mateo Maria, Ramon. Support for reclinable boards. 4,927,107, Cl. 248-240.400.

Mathis, Gerard; and Lehn, Jean-Marie, to Compagnie Oris Industries. Macropolycyclic rare earth complexes and application as fluorescent tracers. 4,927,923, Cl. 540-456.000.

Mathur, Indresh; James, Allan; and Bissett, David, to H-D Tech Inc. Bipolar electrolyzer. 4,927,509, Cl. 204-83.000.

Mathur, Krishna K.; Resnik, Robert K.; and Simmons, Randall G., to Pfizer Inc. Process for the preparation of large surface area, finely divided precipitated calcium carbonate and filled polymeric compositions of matter containing said calcium carbonate. 4,927,618, Cl. 423-432.000.

Mathus, Gregory; and Lyman, George, to Costar Corporation. Multiwell filter plate vacuum manifold assembly. 4,927,604, Cl. 422-101.000.

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Lyman, George; and Mathus, Gregory, 4,927,764, Cl. 435-296.000.

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Nasu, Kazuhiko; Kenmochi, Kazuei; Niikawa, Tomohiko; and Matsui, Atsushi, 4,927,580, Cl. 264-102.000.

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Sakai, Takeshi; Matsui, Susumu; Akiyoshi, Sumiko; and Obayashi, Akira, 4,927,753, Cl. 435-26.000.
Sakai, Takeshi; Yokota, Hiroko; Yamamoto, Kazuki; Yokoyama, Sadaji; Matsui, Susumu; Kato, Ikunoshin; and Obayashi, Akira, 4,927,767, Cl. 436-64.000.

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Tanaka, Hironori; Kotani, Matahira; and Matsumoto, Masafumi, 4,927,130, Cl. 271-10.000.

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Nagura, Satoru; Ebihara, Tsutomu; and Matsumoto, Toshihide, 4,927,682, Cl. 428-88.000.

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Yamaguchi, Mikio; Suzuki, Chiharu; Matsunari, Kenji; Miyazawa, Takeshige; and Nakamura, Yasuo, 4,927,448, Cl. 71-90.000.

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Matsushita Electric Industrial Co., Ltd.: *See*—
Ashihara, Ryohei; Suehiro, Kikumitsu; Sugino, Kazuo; and Miyoshi, Jun, 4,927,719, Cl. 429-54.000.
Naka, Hiroyuki; Hirono, Tomohide; Suzuki, Naoki; and Ichiyanagi, Takashi, 4,927,068, Cl. 228-103.000.
Nasu, Kazuhiko; Kenmochi, Kazuei; Niikawa, Tomohiko; and Matsui, Atsushi, 4,927,580, Cl. 264-102.000.
Ohue, Hiroshi, 4,928,272, Cl. 370-50.000.
Tamura, Haruhisa; Yamasaki, Takahiko; and Hasegawa, Mitsuhiro, 4,927,998, Cl. 219-494.000.
Tanaka, Yasuhiro; Sunohara, Masaaki; Nakajima, Yasuo; and Tanaka, Shinichi, 4,927,247, Cl. 350-432.000.
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Ichinomiya, Tsutomu; Kami, Tomohiro; Kitagawa, Fumio; Wada, Sumio; Abe, Hideaki; Ise, Youichi; and Kusunoki, Toshio, 4,926,881, Cl. 128-804.000.
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Tanaka, Seiichi; Koike, Yutaka; Nakano, Masato; Atsuumi, Shugo; Morishima, Hajime; and Matsuyama, Kenji, 4,927,565, Cl. 260-404.500.

Matsuzaki, Masatoshi: *See*—
Hasegawa, Tai; Momnai, Jun; and Matsuzaki, Masatoshi, 4,928,134, Cl. 346-76.0PH.

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Ezaki, Joichiro; Ito, Yoshiaki; and Matsuzaki, Mikio, 4,928,195, Cl. 360-103.000.

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Fourrey, Francois; and Mauffrey, Jean F., 4,927,210, Cl. 297-366.000.

Max Planck-Gesellschaft zur Foerderung der Wissenschaften e.V.: *See*—
Keilmann, Fritz, 4,927,236, Cl. 350-276.00R.

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May, Roger A., to United States of America, Air Force. Recursive median filtering. 4,928,258, Cl. 364-724.170.

Mayer, Ronald F.; and Thrasher, Robert, Jr., to United Technologies Electro Systems, Inc. Boot sealing and attachment means for automotive door lock actuators and the like. 4,927,203, Cl. 292-201.000.

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Loggins, C. J., 4,926,564, Cl. 33-474.000.

Mazada Motor Corporation: *See*—
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Kita, Tatsuya; Shigemura, Takuro; Nakamura, Setsuo; and Nakane, Hisanori, 4,926,816, Cl. 123-203.000.
Ohmura, Hiroshi; and Nakashima, Takashi, 4,926,955, Cl. 180-140.000.
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Tadokoro, Tomoo; Tashima, Seiji; Okimoto, Haruo; Akagi, Toshimichi; Nakao, Masami; Matsuda, Ikuo; and Suekuni, Einosuke, 4,926,636, Cl. 60-312.000.

McAllister, Matthew: *See*—
Janko, Michael; and McAllister, Matthew, 4,927,057, Cl. 222-5.000.

McArthur, Scot P.: *See*—
Holm-Kennedy, James W.; and McArthur, Scot P., 4,926,682, Cl. 73-54.000.

McCall, Patrick C., to Procter & Gamble Company. Antidandruff shampoo compositions containing a magnesium aluminum silicate-xanthan gum suspension system. 4,927,563, Cl. 252-551.000.

McCarthy, Daniel M.; Circello, Joseph C.; Munguia, Gabriel R.; and Richardson, Nicholas J., to Edgcore Technology, Inc. Coherent cache structures and methods. 4,928,225, Cl. 364-200.000.

McClure, Jonathan T.: *See*—
Martin, Kenneth W.; and McClure, Jonathan T., 4,927,405, Cl. 493-194.000.

McCollum, Anthony W.: *See*—
Stavinoha, Jerome L.; and McCollum, Anthony W., 4,927,878, Cl. 525-44.000.

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McCormick, Sharon J.: *See*—
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McCullough, John E., to Arthur D. Little, Inc. Synchronizing and unloading system for scroll fluid device. 4,927,340, Cl. 418-55.000.

McDowell, W. J.: *See*—
Moyer, Bruce A.; and McDowell, W. J., 4,927,610, Cl. 423-24.000.

McEachern, James A.: *See*—
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McGarry, Patrick J.: *See*—
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McGregor, James D., to Morton Thiokol, Inc. Method of making continuous reinforcement for flexible bearing laminate. 4,927,481, Cl. 156-245.000.

McGregor, John C.: *See*—
Costello, Anthony W.; Ogg, Graeme J.; and McGregor, John C., 4,926,614, Cl. 53-434.000.

McGuire, Daniel J.: *See*—
Schweizer, Werner; McGuire, Daniel J.; and Archer, Edward D., 4,927,322, Cl. 414-794.700.

McGuire, David: *See*—
Goble, E. Marlowe; Somers, W. Karl; and McGuire, David, 4,927,421, Cl. 606-73.000.

McIntyre, Robert W.: *See*—
Hagar, Donald K.; and McIntyre, Robert W., 4,927,351, Cl. 431-12.000.

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McKay, Roy L.: *See*—
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McKee, Robert L. Combined rotary cutter and herbicide applicator and method. 4,926,622, Cl. 56-16.800.

McKenna, Michael E.: *See*—
Syme, Robert W.; and McKenna, Michael E., 4,927,705, Cl. 428-282.000.

McKenna, Peter L.; and Walters, James M., III. Eyeglass holder. 4,927,258, Cl. 351-156.000.

McMurtry, D. R.; Stephens, W. F. N.; and Kirkbride, M., to Renishaw PLC. Method of producing a metrological scale and scale produced by such method. 4,926,566, Cl. 33-771.000.

McNab, Wayne, to Viacount Industries Limited. Electrical box. 4,927,039, Cl. 220-3.700.

McNaughton, James, to Huron Products Corporation. Release tool for fluid quick connectors. 4,927,185, Cl. 285-39.000.

McNeil, Maynard W.: *See*—
Carson, Chrislyn M.; Copping, Leonard G.; Ehr, Robert J.; Gitlitz, Melvin H.; McNeil, Maynard W.; Street, Peter F. S.; and Liebeschuetz, John W., 4,927,812, Cl. 514-63.000.

McNelley, Jerald R. Mounted fuel tank heater. 4,926,830, Cl. 123-557.000.

McNulty, James L.: *See*—
Osmonson, Daniel T.; and McNulty, James L., 4,926,892, Cl. 135-103.000.

McShea, William T., III; and Yarrington, Robert M., to Engelhard Corporation. Method of methanol production. 4,927,857, Cl. 518-703.000.

McWhorter, John: *See*—
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MDT Corporation: *See*—
Hallings, Leonard L.; Bramer, Donald W.; Sanborn, Bruce A.; and Schryver, James E., 4,928,211, Cl. 362-33.000.

Mead Corporation, The: *See*—
Stout, James T., 4,927,009, Cl. 206-188.000.

Meadows, Roger D.; Rush, James B.; and Bryan, James S., to Dayco Products, Inc. Branched hose construction, T-connector therefor and methods of making the same. 4,926,535, Cl. 29-890.144.

Mears, Eric L.; and Jennings, Robert E., to Varian Associates, Inc. Horizontal laminar air flow work station. 4,927,438, Cl. 55-385.200.

Measurex Corporation: *See*—
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Medical Automation Specialties, Inc.: *See*—
Roginski, Edward T., 4,927,545, Cl. 210-745.000.

Medwin, Steven J., to Du Pont de Nemours, E. I., and Company. Method for shaping fiber reinforced resin matrix materials. 4,927,581, Cl. 264-108.000.

Mehregany, Mehran: *See*—
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Mehta, Hemang S.; Holbrook, Gerald L.; and Leising, Maurice B., to Chrysler Corporation. Method of determining the fluid temperature of an electronic automatic transmission system. 4,928,235, Cl. 364-424.100.

Meichsner, Manfred: *See*—
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Meikho Industry Corp., Ltd.: *See*—
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Meislitzer, Karl-Heinz; and Sandmann, Heinz, to Rose Elektrotechnik GmbH & Co. KG. Protective housing for cable joints. 4,927,984, Cl. 174-92.000.

Melcher, Gerhard, to Isovolta Osterreichische Isolierstoffwerke Aktiengesellschaft. Process for producing a decorative foil or sheet containing a polymer plastic, and a foil or plastic produced by this process. 4,927,699, Cl. 428-203.000.

Melzig, Manfred; Rosler, Horst; and Schobl, Medardus, to Optische Werke G. Rodenstock. Anti-reflection film for an optical element consisting of an organic material. 4,927,239, Cl. 350-165.000.

Memmert, Klaus; and Wandrey, Christian, to Kernforschungsanlage Juelich Gesellschaft mit beschraenkter Hagtung. Processes for obtaining exoenzymes by culture. 4,927,751, Cl. 435-3.000.

Menasche, Philippe, to Retroperfusion Systems, Inc. Coronary sinus catheter. 4,927,412, Cl. 604-96.000.

Mercer, William C.: *See*—
Coughlin, Peter K.; Mercer, William C.; and Flanigen, Edith M., 4,927,768, Cl. 436-172.000.

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Merck & Co., Inc.: *See*—
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Merck Sharp & Dohme Limited: *See*—
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Mercure, Roger. Glass rack. 4,927,032, Cl. 211-41.000.

Meredith, Michael D.; Phillips, Joseph R.; Laakso, Richard O.; and Stromberg, C. Bertil, to Kamyr, Inc. Chip gates with air lock. 4,927,312, Cl. 414-221.000.

Merkli, Peter, to Grapha-Holding AG. Apparatus for storing partially overlapping paper sheets. 4,927,129, Cl. 270-60.000.

Merrell Dow Pharmaceuticals: *See*—
Grisar, J. Martin; Dage, Richard C.; and Schnettler, Richard A., 4,927,939, Cl. 548-188.000.

Merrem, Hans-Joachim; Buhr, Gerhard; and Lenz, Ruediger, to Hoechst Aktiengesellschaft. Positive-working photosensitive composition containing a dye and positive-working photosensitive recording material prepared therefrom. 4,927,732, Cl. 430-191.000.

Mesnel, Gerard, to Etablissements Mesnel S.A. Section forming a gripper for automobile gaskets. 4,926,600, Cl. 49-491.000.

Messerschmitt-Bolkow-Blohm GmbH: *See*—
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Metcalf, Robert L., to Wilbanks International, Inc. Can coater/decorator mandrel system. 4,926,788, Cl. 118-500.000.

Meunier, Pierre P., to Canada, Her Majesty the Queen in Right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government. Gas mask nose occluder. 4,926,853, Cl. 128-201.180.

Meurer, Charles L., to Envirotech Corporation. Tape drive with self-expanding coils for sludge collector. 4,927,537, Cl. 210-527.000.

Meyer Company, The: *See*—
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Mayfield, John T., III, 4,927,053, Cl. 221-279.000.

Meyer, W. Thomas: *See*—
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Meyer, Willy: *See*—
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Wieland, Rolf H.; and Krongold, Martin A., 4,927,433, Cl. 55-18.000.

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Mick, Ray E.: *See*—
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Microelectronic & Computer Technology Corp.: *See*—
Hesselink, Lambertus; and Redfield, Steve R., 4,927,220, Cl. 350-3.640.
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Mierzwinski, Eugene P., to Hamilton Standard Controls, Inc. Method of manufacturing an electroluminescent display. 4,927,490, Cl. 156-634.000.
Mihara, Tadashi: *See*—
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Mikic, Frank: *See*—
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Mikol, Erwin F., to Twentieth Century Companies, Inc. Plastic drain auger. 4,926,518, Cl. 15-104.330.
Mikol, Erwin F., to Twenthieth Century Companies, Inc. Adjustable tubular wall structure for connectors and the like. 4,927,191, Cl. 285-226.000.
Miles, Brynley J.: *See*—
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Miles, Philip D.; Moody, John R., Jr.; and O'Keefe, Sheila, to Texas Instruments Incorporated. Loading and accurate measurement of integrated dynamic parameters at point of contact in automatic device handlers. 4,928,062, Cl. 324-158.00R.
Miller, Donald P. Tripod stand for a surveyor's rod. 4,926,561, Cl. 33-293.000.
Miller, Frederick W.: *See*—
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Miller, Glen E.: *See*—
Huggins, Raymond W.; Van Deventer, Bruce; and Miller, Glen E., 4,928,008, Cl. 250-231.100.
Miller, Kurt R.: *See*—
Riihilsoma, Clayton; and Miller, Kurt R., 4,927,157, Cl. 273-260.000.
Miller, Robert O. Method of making a silicon integrated circuit waveguide. 4,927,781, Cl. 437-71.000.
Miller, Robert W. Collapsible bag-supporting frame. 4,927,104, Cl. 248-97.000.
Miller, Theodore H., to Emhart Industries, Inc. Mounting cassette for push-bar exit devices. 4,927,193, Cl. 292-92.000.
Miller, Thomas E.: *See*—
Chang, Steve C. S.; and Miller, Thomas E., 4,927,769, Cl. 436-518.000.
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Milliken, Les; and Milliken, K. Blair. Construction assembly for closure structure. 4,926,605, Cl. 52-63.000.
Millis, David B., to International Business Machines. System for providing three dimensional object descriptions. 4,928,233, Cl. 364-522.000.
Minamitaka, Junichi, to Casio Computer Co., Ltd. Automatic composer using input motif information. 4,926,737, Cl. 84-611.000.
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Minnesota Mining and Manufacturing Company: *See*—
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Dufresne, Joel R.; and Dieken, Alan P., 4,926,864, Cl. 128-421.000.
Kemmler-Sack, Sibylle; Morlotti, Romano; and Reichardt, Jurgen, 4,928,017, Cl. 250-483.100.
Pokorny, Richard J., 4,927,556, Cl. 252-173.000.
Minnick, Lawrence E., to Electric Power Research Institute, Inc. Self-actuating pressure relief device and method for nuclear containment. 4,927,596, Cl. 376-283.000.
Minolta Camera Co., Ltd.: *See*—
Yamada, Takanobu, 4,928,146, Cl. 355-253.000.
Minolta Camera Kabushiki Kaisha: *See*—
Hatta, Yoshihiko, 4,928,150, Cl. 355-311.000.
Iino Shuji, 4,928,125, Cl. 346-140.00R.
Kusumoto, Keiji; and Kinoshita, Naoyoshi, 4,928,136, Cl. 355-315.000.
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Okamoto, Hiroshi; Oka Tateki; Sako, Mineyuki; Kyogoku, Tetsuo; and Suzuki, Toshikazu, 4,928,145, Cl. 355-245.000.
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,928,124, Cl. 354-106.000.
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Mirrorlite, Inc.: *See*—
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Misium, George R., to Texas Instruments, Incorporated. Thermo-enhanced electron image projector. 4,928,018, Cl. 250-492.200.
Miskin, Michael; Bamford, William; and Lake, Micheal D., to Miskin, Michael; and Bamford, William. Razor. 4,926,553, Cl. 30-49.000.
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Sharma, Ravinder K.; Geyer, Harry J.; and Mitchell, Douglas G., 4,927,505, Cl. 204-34.500.
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Mitchell, Matthew P.; and Bauwens, Luc, 4,926,639, Cl. 60-522.000.
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Fujimoto, Takanori; and Hara, Toshirou, 4,926,807, Cl. 123-179.0BG.
Fujimoto, Takanori; and Hara, Toshiro, 4,928,228, Cl. 364-431.090.
Hirano, Sadayuki; Murano, Katsuaki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,926,716, Cl. 74-866.000.
Isozumi, Shuzoo, 4,926,706, Cl. 74-7.00A.
Kimata, Masafumi, 4,928,158, Cl. 357-24.000.
Kusakawa, Takaji; Wakamoto, Katsuyoshi; and Imaizumi, Mitsuyuki, 4,927,467, Cl. 148-3.000.
Masada, Shigeo, 4,928,001, Cl. 235-380.000.
Mitomi, Yoshimichi, 4,927,484, Cl. 156-345.000.
Morishita, Akira; Tanaka, Toshinori; and Isozumi, Shuzoo, 4,926,705, Cl. 74-6.000.
Naya, Eizo; Okumura, Mitsuhiro; and Miyamoto, Seiichi, 4,927,989, Cl. 200-265.000.
Ogawa, Kohji; and Onoki, Mikio, 4,928,300, Cl. 379-53.000.
Sugawara, Sakuo; Hara, Masanori; and Suzuki, Takane, 4,926,839, Cl. 126-96.000.
Wada, Shunichi, 4,927,170, Cl. 280-707.000.
Yamaguchi, Sataro, 4,927,592, Cl. 376-123.000.
Yamamuro, Takahiko, 4,928,173, Cl. 358-102.000.
Yonemoto, Masashi, 4,928,021, Cl. 187-108.000.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Imoto, Koji; Omura, Tadao; Kataoka, Yoichi; Nakajima, Kunihiko; Maekawa, Motoyuki; Tamura, Hiroki; and Shioya, Yoshiaki, 4,926,817, Cl. 123-292.000.
Murasaki, Isao, 4,926,688, Cl. 74-527.000.
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Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Abe, Seiichi, 4,926,836, Cl. 125-11.010.
Mitsubishi Metal Corporation: *See*—
Tsujimura, Osamu; Nakayama, Masaaki; and Okawa, Masayuki, 4,927,303, Cl. 408-223.000.
Mitsubishi Paper Mills Ltd.: *See*—
Fuchigami, Mitsuru; Tachizawa, Shingo; and Ishiguro, Mamoru, 4,927,971, Cl. 564-505.000.
Mitsubishi Rayon Co., Ltd.: *See*—
Anzai, Hisao; Makino, Hideaki; Ootani, Masami; Sasaki, Isao; and Nishida, Kozi, 4,927,893, Cl. 525-378.000.
Hiraoka, Saburo; Hama, Shinji; and Senga, Mitsuo, 4,927,915, Cl. 528-490.000.
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Mitsui Petrochemical Industries, Ltd.: *See*—
Ohori, Yoshiji; and Harazoe, Hirofumi, 4,927,871, Cl. 524-230.000.
Mittel, James G.: *See*—
Grandfield, Walter J.; Mittel, James G.; and Davis, Walter L., 4,928,314, Cl. 455-236.000.
Mitzutani, Satoshi: *See*—
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Miyagawa, Yuichi: *See*—
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Miyahara, Kazuhiro: *See*—
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Miyai, Kenzi: *See*—
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Miyajima, Nobukazu; Tanaka, Akira; and Shinoda, Masaru, to Nihon Kohden Corporation. Defibrillation system. 4,926,862, Cl. 428-419.00D.

Miyake, Toshio: *See*—
Hijiya, Hiromi; and Miyake, Toshio, 4,927,636, Cl. 424-409.000.

Miyaki, Takeo: *See*—
Konishi, Masataka; Shimizu, Keiko; Ohbayashi, Masaru; Tomita, Koji; Miyaki, Takeo; and Oki, Toshikazu, 4,927,848, Cl. 514-453.000.

Miyamoto, Seiichi: *See*—
Naya, Eizo; Okumura, Mitsuhiro; and Miyamoto, Seiichi, 4,927,989, Cl. 200-265.000.

Miyamura, Tetsuo, to Wacoal Corp. Corset for alleviation of lumbago. 4,926,502, Cl. 2-44.000.

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Miyazaki, Takeshi: *See*—
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Miyazaki, Teruko, to Ciba-Geigy Corporation. Curable polyurethane casting systems and amine hardeners therefor. 4,927,901, Cl. 528-64.000.

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Yamaguchi, Mikio; Suzuki, Chiharu; Matsunari, Kenji; Miyazawa, Takeshige; and Nakamura, Yasuo, 4,927,448, Cl. 71-90.000.

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Ashihara, Ryohei; Suchiro, Kikusuitsu; Sugino, Kazuo; and Miyoshi, Jun, 4,927,719, Cl. 429-54.000.

Miyoshi, Naoto: *See*—
Matsumoto, Shinichi; Miyoshi, Naoto; Kimura, Mareo; Ozawa, Masakuni; and Isogai, Akio, 4,927,799, Cl. 502-303.000.

Mizerski, Krzysztof: *See*—
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Mizukami, Toru; Katsumata, Ryoichi; and Oka, Tetsuo, to Kyowa Hakko Kogyo Co., Ltd. Process for producing histidine. 4,927,758, Cl. 435-107.000.

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Yagi, Nobuyuki; Inagaki, Jiro; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,928,082, Cl. 338-174.000.

Mizushima, Yukio: *See*—
Matsutani, Shigeru; and Mizushima, Yukio, 4,927,829, Cl. 514-258.000.

Mizusugi, Tetsuya: *See*—
Honjo, Seiichiro; Yamada, Kazuo; Fuchigami, Yasuhiro; and Mizusugi, Tetsuya, 4,927,443, Cl. 65-273.000.

Mizutani, Junichi: *See*—
Inui, Shuji; Hiramitsu, Tetsushi; Takahaski, Toshinori; Tamaki, Makoto; Kikuta, Mitsuhiro; and Mizutani, Junichi, 4,927,364, Cl. 439-15.000.

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Mniece, James R.: *See*—
Brock-Fisher, George A.; Kranz, Paul R.; Mniece, James R.; Thiele, Karl E.; Savord, Bernard J.; and Smith, Richard B., 4,926,872, Cl. 128-661.010.

Mobil Oil Corporation: *See*—
Anderson, Conroy D.; Chou, Tai-Sheng; Cormier, William E., Jr.; Dwyer, Francis G.; Krambeck, Frederick J.; Pasquale, Gary M.; Schipper, Paul H.; and Stover, William A., 4,927,526, Cl. 208-152.000.
Avidan, Amos A., 4,926,766, Cl. 110-342.000.
Avidan, Amos A., 4,927,348, Cl. 431-7.000.
Bell, Weldon K.; and Haag, Werner O., 4,927,924, Cl. 540-536.000.
Child, Jonathan E.; Choi, Byung C.; and Ragonese, Francis P., 4,927,977, Cl. 568-695.000.
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Chu, Yung F., 4,927,525, Cl. 208-138.000.
Donnelly, Susan P., 4,927,523, Cl. 208-120.000.
Haddad, James H.; and Owen, Hartley, 4,927,527, Cl. 208-161.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,927,522, Cl. 208-120.000.
Herrington, Fox J., 4,927,574, Cl. 264-40.600.
Hoskin, Dennis H., 4,926,943, Cl. 166-270.000.
Neeley, Walter P.; and Ritter, Sammie F., 4,928,262, Cl. 367-106.000.
Stromswold, David C., 4,926,940, Cl. 166-247.000.

Mobile Music, Inc.: *See*—
Smith, Gary, 4,926,735, Cl. 84-453.000.

Mobilio, Dominick, to American Home Products Corporation. 2,3,4,9-tetrahydro-1H-carbazole acetic acid derivatives, composition and use as anti-inflammatories. 4,927,842, Cl. 514-411.000.

Moen, Bruce A.: *See*—
Grims, Conrad M.; Moen, Bruce A.; and Pardubicky, Jaroslav F., 4,926,669, Cl. 72-349.000.

Molex Incorporated: *See*—
Patel, Arvind, 4,927,787, Cl. 439-189.000.

Molund, Gunnar: *See*—
Engdahl, Goran; and Molund, Gunnar, 4,927,334, Cl. 417-322.000.

Molzahn, David C.; Hartwell, George E.; and Bowman, Robert G., to Dow Chemical Company, The. Preparation of alkyl-extended, alcohol-extended or amine-extended piperazines. 4,927,931, Cl. 544-357.000.

Moncada, Elizabeth; and Schneider, Michael B., to Schneider Medical Technologies, Inc. Safety sleeve adapter. 4,927,417, Cl. 604-198.000.

Monma, Hisayoshi; and Suganuma, Atsushi, to Fuji Photo Film Co., Ltd. Method and apparatus for driving laser beam source to avoid droop effects. 4,928,277, Cl. 369-116.000.

Monnai, Jun: *See*—
Hasegawa, Tai; Monnai, Jun; and Matsuzaki, Masatoshi, 4,928,134, Cl. 346-76.0PH.

Monoyios, Terry. Shiftable block puzzle. 4,927,150, Cl. 273-153.00S.

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Feder, Joseph; Howard, Susan C.; Wittwer, Arthur J.; Rademacher, Thomas W.; Parekh, Raj B.; and Dwek, Raymond A., 4,927,630, Cl. 424-94.640.

Montali, Gian Luigi, to S.T.S. SRL. Device for determining a preset number of containers, partially inserted within one another forming a package of the same containers. 4,927,319, Cl. 414-788.400.

Montgomery, David B.: *See*—
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Moody, John R., Jr.: *See*—
Miles, Philip D.; Moody, John R., Jr.; and O'Keefe, Sheila, 4,928,062, Cl. 324-158.00R.

Moore, Anthony J.: *See*—
Diaz, Stephen H.; Cherian, Gabe; Morris, Stephen; Vinson, John R.; Crofts, David; and Moore, Anthony J., 4,928,199, Cl. 361-56.000.

Moore, Billy G., to Koppl Industrial Systems, Inc. Pipeline repair clamp. 4,927,182, Cl. 285-15.000.

Moore Business Forms, Inc.: *See*—
Jenkins, Richard A.; and Hutchinson, Wilbur P., 4,927,072, Cl. 229-92.300.

Moore, Donald J.: *See*—
Coup, Michael C.; Israel, Gary P.; Ediger, Glen W.; and Moore, Donald J., 4,927,324, Cl. 415-121.200.

Moore, Eugene R., to Dow Chemical Company, The. Method for making fiber-reinforced plastics. 4,927,579, Cl. 264-101.000.

Moore, Gerry W.: *See*—
Dhanakoti, Padmanabhan; Moore, Gerry W.; and Smith, Harold F., 4,927,692, Cl. 428-137.000.

Moore, Loyd C.: *See*—
Lilly, Carol E. H.; Moore, Loyd C.; Eike, Mark E.; and Barker, Nicholas E., 4,926,758, Cl. 108-43.000.

Moore, Thomas E.; McEachern, James A.; and Wight, Mark S., to Northern Telecom Limited. Synchronization of asynchronous data signals. 4,928,275, Cl. 370-102.000.

Morane, Bruno; and Joulia, Gerard, to L'Oreal. Container for nail polish. 4,927,282, Cl. 401-129.000.

Morano, Jacqueline K.; Martin, Francis J.; and Woodle, Martin, to Liposome Technology, Inc. Liposome extrusion method. 4,927,637, Cl. 424-450.000.

Morgan, Ruth B. Keyboards for homes. 4,927,279, Cl. 400-486.000.

Mori, Nobufumi; Muraishi, Katsuaki; Matsuda, Terumi; Ohnishi, Masahiro; Nunome, Hiromi; Koyama, Tadao; and Oikawa, Tetsuo, to Fuji Photo Film Co. Ltd. Magazine for accommodating recording medium for electron microscope. 4,928,016, Cl. 250-440.100.

Mori, Sanae, to 501 Daido Metal Company Ltd. Overlay alloy used for a surface layer of sliding material. 4,927,715, Cl. 428-645.000.

Mori, Shuichi: *See*—
Yamamoto, Hideo; Sato, Takeshi; Yoshimi, Toshikazu; Mori, Shuichi; and Tokumo, Akio, 4,928,071, Cl. 330-129.000.

Mori, Takaaki: *See*—
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Morishima, Hajime: *See*—
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Morishita, Akira; Tanaka, Toshinori; and Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Starter device for internal combustion engines. 4,926,705, Cl. 74-6.000.

Morishita, Taro: *See*—
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Morizumi, Mitsuo; Omura, Kinya; Arita, Eriya; Furuya, Katsuji; Yasuda, Sakae; and Kodera, Masaya, to Nissan Motor Company, Limited; and Tsuchiya Mfg. Co., Ltd. Vent control valve attached to fuel filler tube. 4,926,914, Cl. 141-59.000.
Morlotti, Romano: *See*—
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Morrill Glasstek, Inc.: *See*—
Morrill, Vaughan, Jr.; Scandrett, John H.; and Hudson, David K., 4,926,543, Cl. 29-623.000.
Morrill, Vaughan, Jr.; Scandrett, John H.; and Hudson, David K., to Morrill Glasstek, Inc. Method of making a sub-miniature fuse. 4,926,543, Cl. 29-623.000.
Morris, Arnold M.; D'Zurko, Daphne; Pilsbury, Richard H.; Barkell, J. Warren, Jr.; Orndorff, Karl B.; and Lawson Randall S., to Inventio AG. Elevator car with improved car door clutch. 4,926,974, Cl. 187-52.0LC.
Morris, Arnold M., to Inventio AG. Elevator car with improved door lock. 4,926,975, Cl. 187-57.000.
Morris, Arthur J.: *See*—
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Morris, Daniel C., II: *See*—
Morse, James D.; and Morris, Daniel C., II, 4,926,578, Cl. 43-42.240.
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Morris, Thomas E.: *See*—
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Morrison Berkshire, Inc.: *See*—
Stanislaw, Peter P., 4,926,530, Cl. 28-111.000.
Morrissey, Mark E.; and Schiemer, Thomas, Jr. Game of horseshoes. 4,927,159, Cl. 273-338.000.
Morse, James D.; and Morris, Daniel C., II. Fishing lure. 4,926,578, Cl. 43-42.240.
Morton Thiokol, Inc.: *See*—
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Moses, Joseph: *See*—
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Motorola Inc.: *See*—
Alvarez, Antonio R.; and Kirchgessner, James A., 4,927,775, Cl. 437-31.000.
Alvis, John R.; Pfiester, James R.; and Holland, Orin W., 4,928,156, Cl. 357-23.400.
Corley, Dean; and Littlebury, Hugh, 4,928,002, Cl. 235-479.000.
Drspac, George; and Grandfield, Walter J., 4,928,086, Cl. 340-825.440.
Grandfield, Walter J.; Mittel, James G.; and Davis, Walter L., 4,928,314, Cl. 455-236.000.
Leonardo, Victoria A.; and Nelson, Leonard E., 4,928,096, Cl. 340-825.440.
Leak, Israel A.; Thomas, Ronald E.; Hawkins, George W.; and Rugg, James M., 4,928,162, Cl. 357-72.000.
Main, William E., 4,928,068, Cl. 329-324.000.
Nogle, Scott G.; Pelley, Perry H., III; Flannagan, Stephen T.; and Engles, Bruce E., 4,928,268, Cl. 365-230.030.
Roth, Scott S.; Nguyen, Bich-Yen; Tobin, Philip J.; Ray, Wayne; Wachholz, E. Petyr; and Wissen, Glenn, 4,927,780, Cl. 437-69.000.
Sharma, Ravinder K.; Geyer, Harry J.; and Mitchell, Douglas G., 4,927,505, Cl. 204-34.500.
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Motozawa, Yasuki, to Honda Giken Kogyo Kabushiki Kaisha. Mechanical acceleration sensor. 4,927,172, Cl. 280-734.000.
Mottate, Tatsuo, to Nippon Thompson Co., Ltd. Linear motion rolling contact bearing assembly having a feed-in port. 4,927,273, Cl. 384-45.000.
Motz, Kaye L.; Latham, Roger A.; and Statz, Robert J., to Du Pont de Nemours, E. I., and Company. Low pour crude oil compositions. 4,926,582, Cl. 44-62.000.
Mouesca, Bruno; and Ladonceur, Bruno. Control cluster provided with removable control elements for a nuclear fuel reactor. 4,928,291, Cl. 376-327.000.
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Mourou, Gerard A.; Nees, John A.; and Williamson, Steven L., to University of Rochester, The. Ultrafast optical modulator. 4,928,076, Cl. 330-4.300.
Moy, Michael E.; Beavers, Kelly J.; Bray, Stuart W.; Goodknight, Frank A.; Kummli, Paul; Kutasy, Eugene; Lucchesi, Raymond L.; Munro, Frederick G.; Sellke, Richard G.; and Studebaker, Thomas J., to Storage Technology Corporation. Automated cartridge system. 4,928,245, Cl. 364-513.000.
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Moyer, Bruce A.; and McDowell, W. J., to United States of America, Energy. Method for extracting copper, silver and related metals. 4,927,610, Cl. 423-24.000.
MTU Motoren-Und Turbinen-Union Muenchen GmbH: *See*—
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Muchnick, Steven S.: *See*—
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Mueller, Mark, to Penn's Woods Products, Inc. Diaphragm game call with tone modifying slits. 4,927,399, Cl. 446-207.000.
Mueller, Werner H.; and Khanna, Dinesh N., to Hoechst Celanese Corporation. Hydroxy polyimides and high temperature positive photoresists therefrom. 4,927,736, Cl. 430-275.000.
Muhlmann, Carl P. M.: *See*—
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Muhlratzer, August; Handrick, Karin; Lassmann, Siegfried; and Hirt, Alfred, to Man Technologie AG. Thermal insulating material. 4,927,702, Cl. 428-215.000.
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Mulder, Douglas C.: *See*—
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Muller, Karl H.; Riedl, Volker; and Arbesmeier, Bernhard, to Audi AG. Apparatus having a lifting frame for processing workpieces. 4,926,539, Cl. 29-568.000.
Muller, Klaus-Helmut: *See*—
Fest, Christa; Muller, Klaus-Helmut; Pfister, Theodor; Riebel, Hans-Jochem; Kysela, Ernst; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Robert H., 4,927,454, Cl. 71-93.000.
Mullin, John G.: *See*—
Guthrie, Robert W.; Kierstead, Richard W.; Mullin, John G.; and Tilley, Jefferson W., 4,927,838, Cl. 514-337.000.
Munguia, Gabriel R.: *See*—
McCarthy, Daniel M.; Circello, Joseph C.; Munguia, Gabriel R.; and Richardson, Nicholas J., 4,928,225, Cl. 364-200.000.
Munro, Frederick G.: *See*—
Moy, Michael E.; Beavers, Kelly J.; Bray, Stuart W.; Goodknight, Frank A.; Kummli, Paul; Kutasy, Eugene; Lucchesi, Raymond L.; Munro, Frederick G.; Sellke, Richard G.; and Studebaker, Thomas J., 4,928,245, Cl. 364-513.000.
Murai, Yukio: *See*—
Okumura, Katsuya; Kuriyama, Fumio; Murai, Yukio; Tsujimura, Manabu; and Sobukawa, Hiroshi, 4,926,648, Cl. 62-55.500.
Muraishi, Katsuaki: *See*—
Mori, Nobufumi; Muraishi, Katsuaki; Matsuda, Terumi; Ohnishi, Masahiro; Nunome, Hiromi; Koyama, Tadao; and Oikawa, Tetsuo, 4,928,016, Cl. 250-440.100.
Murakami, Kazutomo: *See*—
Mizuno, Keiichiro; Iida, Kazuyoshi; and Murakami, Kazutomo, 4,926,985, Cl. 188-378.000.
Murakawa, Masatake; Bando, Niro; Tone, Masatsugu; Yuki, Mikio; Miyata, Junji; Hayashi, Tetsuaki; and Kurohara, Kazuaki, to Kubota, Ltd. Lawn mower. 4,926,624, Cl. 56-202.000.
Murano, Katsuaki: *See*—
Hirano, Sadayuki; Murano, Katsuaki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,926,716, Cl. 74-866.000.
Murasaki, Isao, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Parking lock for automotive vehicles. 4,926,688, Cl. 74-527.000.
Murata, Jun, to Canon Kabushiki Kaisha. Platen roller. 4,927,280, Cl. 400-661.000.
Murdock, Clifford R. Pickup truck cap. 4,927,206, Cl. 296-156.000.
Muroi, Hidenori, to Tokyo Electric Co., Ltd. Automatic POS loop switching apparatus. 4,928,279, Cl. 371-11.200.

Murphy, Donald R.: *See—*
Bach, William D.; and Murphy, Donald R., 4,927,377, Cl. 439-367.000.

Murphy, Kent A.: *See—*
Zimmermann, Bernd D.; Claus, Richard O.; and Murphy, Kent A., 4,928,004, Cl. 250-227.140.

Murphy, Maurice W.: *See—*
Franklin, Douglas E.; Murphy, Maurice W.; and Palylyk, Richard A., 4,926,691, Cl. 73-579.000.

Murphy, Patrick J.; and Svenkeson, John W., to Unisys Corporation (Formerly Burroughs Corp). High density connector. 4,927,370, Cl. 439-74.000.

Murray, David L., to Deutz-Allis Corporation. Master/slave hydraulic system for adjusting the support wheels of an articulated implement. 4,927,165, Cl. 280-43.230.

Musschoot, Albert, to General Kinematics Corporation. Vibratory tumbling apparatus. 4,926,601, Cl. 51-7.000.

Mutez, Sylvain: *See—*
Perron, Roberi; and Mutez, Sylvain, 4,927,957, Cl. 560-202.000.

Myohl, Jochim; and Kasparek, Alfred, to Korber AG. Apparatus for manipulating rod-shaped articles. 4,926,887, Cl. 131-91.000.

N I T I "Veda": *See—*
Andonov, Blagoy A., 4,926,626, Cl. 57-18.000.

Naarmann, Herbert; and Theophilou, Nicolas, to BASF Aktiengesellschaft. Method for producing uncrosslinked polyacetylene film. 4,927,578, Cl. 264-81.000.

Nabisco Brands, Inc.: *See—*
Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, 4,927,658, Cl. 426-611.000.
Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, 4,927,659, Cl. 426-611.000.

Nagai, Kougi: *See—*
Ito, Yoshiaki; Nagai, Kougi; Sawada, Akihiko; and Koike, Hideyuki, 4,927,338, Cl. 417-462.000.

Nagaishi, Toshimi: *See—*
Tanaka, Yoshiyasu; Nagaishi, Toshimi; and Suzuki, Mituyoshi, 4,927,229, Cl. 350-96.210.

Nagamatsu, Mutuo. Box for cultivating plant. 4,926,586, Cl. 47-66.000.

Nagao, Yoshiaki: *See—*
Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, 4,927,278, Cl. 400-208.000.

Nagashima, Yukihito: *See—*
Manabe, Seiichiro; and Nagashima, Yukihito, 4,927,446, Cl. 65-347.000.

Nagata, Mitsuo: *See—*
Aoki, Kenji; Nagata, Mitsuo; Nakamura, Haruo; and Miura, Teiji, 4,927,242, Cl. 350-346.000.

Nagatomo, Yasushi: *See—*
Aoki, Kazuo; Chiba, Toshimi; Tachibana, Sadao; and Nagatomo, Yasushi, 4,927,990, Cl. 200-517.000.

Nagatsuma, Nobuyoshi: *See—*
Yoshioka, Hiroshi; Nagatsuma, Nobuyoshi; and Kobayashi, Shinobu, 4,926,972, Cl. 184-109.000.

Nagoya Institute of Technology: *See—*
Umeno, Masayoshi; Sakai, Shiro; and Yahagi, Shinichiro, 4,928,154, Cl. 357-16.000.

Nagura, Osamu: *See—*
Hakuta, Shinsaku; Yasaka, Yasuhiro; Nagura, Osamu; Tsuji, Eiji; Suzuki, Makoto; and Akagawa, Hirotaka, 4,926,541, Cl. 29-598.000.

Nagura, Satoru; Ebihara, Tsutomu; and Matsumoto, Toshihide, to Toray Industries, Inc. Heat-resistant flock sheet. 4,927,682, Cl. 428-88.000.

Nagy, Geza: *See—*
Stuber, Istvan; Nagy, Geza; and Petrak, Peter, 4,927,253, Cl. 350-508.000.

Naito, Kenzo; Ishibashi, Yukio; and Shinbo, Haruo, to Takeda Chemical Industries, Ltd. Method for production of 2-oxyimino-3-oxobutyric acids. 4,927,964, Cl. 562-560.000.

Naka, Hiroyuki; Hirono, Tomohide; Suzuki, Naoki; and Ichiyanagi, Takashi, to Matsushita Electric Industrial Co., Ltd. Method for heating a patterned substrate. 4,927,068, Cl. 228-103.000.

Nakada, Masayuki: *See—*
Takahashi, Shuzo; Tsuchida, Yutaka; Osada, Shiro; Hasebe, Nobuhisa; and Nakada, Masayuki, 4,926,925, Cl. 164-154.000.

Nakada, Tatsuo: *See—*
Kagiya, Tsutomu; Abe, Mitsuyuki; Nishimoto, Seiichi; Shibamoto, Yuta; Shimokawa, Kazuhiro; Hisanaga, Yorisato; Nakada, Tatsuo; and Yoshizawa, Toru, 4,927,941, Cl. 548-264.800.

Nakagawa, Akio; Ohashi, Hiromichi; Yamaguchi, Yoshihiro; Watanabe, Kiminori; and Thukakoshi, Thuneo, to Kabushiki Kaisha Toshiba. Lateral conductivity modulated MOSFET. 4,928,155, Cl. 357-23.400.

Nakahara, Yasuhiro: *See—*
Sakamoto, Kiyoaki; Matsubara, Kenichi; Nakahara, Yasuhiro; and Nomura, Masaki, 4,927,531, Cl. 210-198.200.

Nakai, Noboru: *See—*
Iwasawa, Naozumi; Isozaki, Osamu; and Nakai, Noboru, 4,927,884, Cl. 525-195.000.

Nakajima, Kiyoji: *See—*
Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, 4,926,906, Cl. 137-625.300.

Nakajima, Kunihiko: *See—*
Imoto, Koji; Omura, Tadao; Kataoka, Yoichi; Nakajima, Kunihiko; Maekawa, Motoyuki; Tamura, Hiroki; and Shioya, Yoshiaki, 4,926,817, Cl. 123-292.000.

Nakajima, Yasuo: *See—*
Tanaka, Yasuhiro; Sunohara, Masaaki; Nakajima, Yasuo; and Tanaka, Shinichi, 4,927,247, Cl. 350-432.000.

Nakakoshi, Masamichi: *See—*
Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, 4,927,959, Cl. 560-193.000.

Nakamatsu, Shuji: *See—*
Nishiki, Yoshinori; Nakamatsu, Shuji; and Shimamune, Takayuki, 4,927,800, Cl. 502-349.000.

Nakamura, Haruo: *See—*
Aoki, Kenji; Nagata, Mitsuo; Nakamura, Haruo; and Miura, Teiji, 4,927,242, Cl. 350-346.000.

Nakamura, Hisashi; Takahashi, Satoshi; Ikeda, Takayuki; and Ogino, Masaaki, to Diesel Kiki Co., Ltd. Pressure equalizer valve device of fuel injection pump. 4,926,902, Cl. 137-493.300.

Nakamura, Hisashi: *See—*
Kurosawa, Hinoko; Itoh, Kazuya; Nakamura, Hisashi; and Ishihara, Masamichi, 4,928,281, Cl. 371-51.100.

Nakamura, Masahiko: *See—*
Yamamoto, Hajime; Takashima, Yuji; Kitagaki, Kazunori; and Nakamura, Masahiko, 4,927,724, Cl. 430-45.000.

Nakamura, Nobuo: *See—*
Tanaka, Toshiyuki; Kuga, Shigeki; Nakamura, Nobuo; Morishita, Taro; and Wada, Masahiro, 4,928,236, Cl. 364-513.000.

Nakamura, Setsuo: *See—*
Kita, Tatsuya; Shigemura, Takuro; Nakamura, Setsuo; and Nakane, Hisanori, 4,926,816, Cl. 123-203.000.

Nakamura, Shozo: *See—*
Gotoh, Masao; Hira, Yasuo; Waragai, Kenichi; Nakamura, Shozo; and Yokono, Hitoshi, 4,927,044, Cl. 220-83.000.

Nakamura, Tamio: *See—*
Aramaki, Minoru; Sakaguchi, Hiroaki; and Nakamura, Tamio, 4,927,962, Cl. 562-113.000.

Nakamura, Yasuhiro: *See—*
Fujino, Yuuji; and Nakamura, Yasuhiro, 4,928,215, Cl. 362-61.000.

Nakamura, Yasuo: *See—*
Yamaguchi, Mikio; Suzuki, Chiharu; Matsunari, Kenji; Miyazawa, Takeshige; and Nakamura, Yasuo, 4,927,448, Cl. 71-90.000.

Nakane, Hisanori: *See—*
Kita, Tatsuya; Shigemura, Takuro; Nakamura, Setsuo; and Nakane, Hisanori, 4,926,816, Cl. 123-203.000.

Nakane, Toshio; Hijikata, Kenji; Kageyama, Yukihiko; and Takahashi, Katsuhiko, to Polyplastics Co., Ltd. Silicon-containing copolyester and method of producing the same. 4,927,895, Cl. 525-438.000.

Nakanishi, Yasuaki; and Inoue, Masao, to Mitsubishi Rayon Co., Ltd. Rear projection screen. 4,927,233, Cl. 350-128.000.

Nakaniwa, Shimpei; and Itoh, Toshibumi, to Japan Electronic Control Systems Co., Ltd. Electric air-fuel ratio control apparatus for use in internal combustion engine. 4,926,826, Cl. 123-489.000.

Nakano, Masato: *See—*
Tanaka, Seiichi; Koike, Yutaka; Nakano, Masato; Atsuumi, Shugo; Morishima, Hajime; and Matsuyama, Kenji, 4,927,565, Cl. 260-404.500.

Nakao, Masami: *See—*
Tadokoro, Tomoo; Tashima, Seiji; Okimoto, Haruo; Akagi, Toshimichi; Nakao, Masami; Matsuda, Ikuo; and Suekuni, Einosuke, 4,926,636, Cl. 60-312.000.

Nakashima, Kazutaka; and Saito, Kazuya, to Dowa Mining Co., Ltd.; and Yazaki Corporation. Monolithic female connector. 4,927,788, Cl. 439-887.000.

Nakashima, Takashi: *See—*
Ohmura, Hiroshi; and Nakashima, Takashi, 4,926,955, Cl. 180-140.000.

Nakata, Yutaka, to Ichikoh Industries, Ltd. Projector-type head lamp for vehicles. 4,928,213, Cl. 362-61.000.

Nakatani, Tomofumi: *See—*
Kaneuchi, Kunihiro; Yasuda, Seigou; Ariyoshi, Takashi; Nakatani, Tomofumi; and Aizawa, Hiroshi, 4,928,302, Cl. 379-88.000.

Nakatsu, Hiroshi, to Sharp Kabushiki Kaisha. Socket for semiconductor device. 4,927,371, Cl. 439-79.000.

Nakayama, Hiromichi: *See—*
Ohkawa, Toshiya; Nakayama, Hiromichi; and Iguchi, Tatsuya, 4,927,287, Cl. 403-408.100.

Nakayama, Masaaki: *See—*
Tsujimura, Osamu; Nakayama, Masaaki; and Okawa, Masayuki, 4,927,303, Cl. 408-223.000.

Nakayama, Nobuhiro: *See—*
Isoda, Tetsuo; Watanabe, Yoichiro; Nakayama, Nobuhiro; and Aoki, Mitsuo, 4,927,728, Cl. 430-108.000.

Nakayama, Yoshiaki: *See—*
Takahashi, Kimihide; Sasaki, Hidemi; and Nakayama, Yoshiaki, 4,928,179, Cl. 358-210.000.

Nalesnik, Theodore E.: *See—*
Karol, Thomas J.; and Nalesnik, Theodore E., 4,927,562, Cl. 252-51.50A.

Narumi, Ichiro, to Pioneer Electronic Corporation. Movable-member supporting apparatus. 4,927,235, Cl. 350-252.000.

Narumi, Naoaki: *See—*
Otsuji, Taiichi; and Narumi, Naoaki, 4,928,278, Cl. 371-1.000.

Nash, Dudley O.; and Herzner, Frederick C., to United States of America, Air Force. Coolant pressure regulating apparatus. 4,926,633, Cl. 60-226.100.
Nash, Thomas W., to Xerox Corporation. Auger unit. 4,926,790, Cl. 118-653.000.
Nashua Corporation: *See—*
Mahmud, Meftah U., 4,927,801, Cl. 503-200.000.
Nassar, Lawrence G. Method and device for limiting internalleolar expansion. 4,926,846, Cl. 128-80.00H.
Nasu, Kazuhiko; Kenmochi, Kazuei; Niikawa, Tomohiko; and Matsui, Atsushi, to Matsushita Electric Industrial Co., Ltd. Method for manufacturing electronic device including a vibration generating element. 4,927,580, Cl. 264-102.000.
National Medical Device Corporation: *See—*
Tomkiel, Stanley, 4,927,416, Cl. 604-198.000.
National Research Development Corporation: *See—*
Neale, Michael A.; and Klinner, Wilfred E., 4,926,749, Cl. 100-177.000.
National Rolling Mills, Inc.: *See—*
Platt, William J.; and Rose, Thomas E., 4,926,607, Cl. 52-484.000.
National Science Council: *See—*
Hsiue, Ging-Ho; and Huang, Wen-Kuei, 4,927,890, Cl. 525-301.000.
National Semiconductor Corporation: *See—*
Pease, Robert A., 4,928,056, Cl. 323-314.000.
Navarro, Hector D.: *See—*
Demeter, Jozsef; Zoltai, Tibor; and Navarro, Hector D., 4,928,051, Cl. 318-731.000.
Navarro, Jose A.: *See—*
de la Rosa, Francisco F.; Navarro, Jose A.; Roncel, Mercedes; and de la Rosa, Miguel A., 4,927,512, Cl. 204-157.500.
Navistar International Transportation Corp.: *See—*
Cailey, Fred L., 4,926,812, Cl. 123-193.00H.
Gosaler, Hans K.; and Roberts, Charles P., 4,927,026, Cl. 206-600.000.
Nawothnig, Klaus, to Wachtersbacher Keramik Otto Friedrich Furst zu Ysenburg und Budingen GmbH & Co. KG. Method of producing colored decorations on ceramic products. 4,927,671, Cl. 427-274.000.
Naya, Eizo; Okumura, Mitsuhiro; and Miyamoto, Seiichi, to Mitsubishi Denki Kabushiki Kaisha. Contact material for vacuum circuit breaker. 4,927,989, Cl. 200-265.000.
NCR Corporation: *See—*
Crafts, Harold S., 4,928,160, Cl. 357-54.000.
Kluttz, James S., 4,928,218, Cl. 363-37.000.
Porter, Warren W.; and Lauffer, Donald K., 4,928,206, Cl. 361-385.000.
Vo, Tri T., 4,928,290, Cl. 375-118.000.
Neale, Michael A.; and Klinner, Wilfred E., to National Research Development Corporation. Rotary compaction of fibrous material. 4,926,749, Cl. 100-177.000.
Nebraska Department of Economic Development, State of Nebraska, U.S.A.: *See—*
Wagner, Frederick W.; de la Motte, Rebecca S.; and Dean, Maria A., 4,927,920, Cl. 536-119.000.
NEC Corporation: *See—*
Kiyono, Mikio, 4,927,221, Cl. 350-96.140.
Sakai, Hiroshi, 4,928,304, Cl. 379-94.000.
Sekiguchi, Sunao, 4,928,238, Cl. 364-200.000.
Soejima, Katsumoto, 4,927,776, Cl. 437-33.000.
Nedorezov, Vladimir A.: *See—*
Komarov, Alexandr N.; Shevtsov, Vitaly T.; Zema, Viktor E.; Lebedik, Grigory L.; Zema, Evgeny M.; Nedorezov, Vladimir A.; Oblovatsky, Anatoly K.; Drozdov, Boris Y.; Zezjulinsky, Andrei A.; Kovalenko, Sergei V.; Litvin, Alexandr N.; Yatsenko, Vladislav P.; and Katunin, Alexandr N., 4,927,121, Cl. 267-47.000.
Neeley, Walter P.; and Ritter, Sammie F., to Mobil Oil Corporation. Marine seismic streamer retrieval system. 4,928,262, Cl. 367-106.000.
Nees, John A.: *See—*
Mourou, Gerard A.; Nees, John A.; and Williamson, Steven L., 4,928,076, Cl. 330-4.300.
Nehls, Charles O., to Unistrut International Corp. Breakaway sign post coupling. 4,926,592, Cl. 52-98.000.
Nelson, Leonard E.: *See—*
Leonardo, Victoria A.; and Nelson, Leonard E., 4,928,096, Cl. 340-825.440.
Nelson, Norvell J.; and Martens, Phillip A., to PSI Star. Copper etching process and product with controlled nitrous acid reaction. 4,927,700, Cl. 428-209.000.
Nerone, Louis R., to General Electric Company. Power control circuit for discharge lamp and method of operating same. 4,928,038, Cl. 315-209.00R.
Nespor, Ronald B., to Chevron, Inc. Vehicle lifting and towing apparatus. 4,927,315, Cl. 414-563.000.
Nestec S.A.: *See—*
Hsu, Jau Y.; and Larson, Gary J., 4,927,662, Cl. 426-658.000.
Roychoudhury, Rathindra N., 4,927,566, Cl. 260-412.000.
Netall- u. Kunstatoffwaren Erzeugengsgesellschaft M.B.H.: *See—*
Schneider, Rudolf, 4,927,363, Cl. 433-173.000.
Neuhaus, Winifried: *See—*
Schrader, Dieter; and Neuhaus, Winifried, 4,927,627, Cl. 424-62.000.
NeuroSonics, Inc.: *See—*
Wright, Geoffrey D.; and Pirali, Edmund, 4,926,969, Cl. 128-731.000.
Neuroth, David H., to Hubbell Incorporated. Electrical cable connector for use in oil wells. 4,927,386, Cl. 439-589.000.
New World Domestic Appliances Limited: *See—*
Parker, Christopher; and Andrews, Gordon T., 4,926,837, Cl. 126-21.00H.
Newkirk, John B.; and Manwaring, Kim H., to Colorado Biomedical, Inc. Ultra-sharp tungsten needle for electrosurgical knife. 4,927,420, Cl. 606-45.000.
Newman, John W.: *See—*
Ward, Clifford; Chao, Eugene; Booth, Roy E.; Turrill, Frank H.; Womblea, Robert H.; Newman, John W.; and Hettinger, William P., Jr., 4,927,620, Cl. 423-447.200.
Neynaber Chemie GmbH: *See—*
Hirsch, Albrecht; and Fleischer, Erwin, 4,927,548, Cl. 252-17.000.
NGK Insulators, Ltd.: *See—*
Mizutani, Yoshihiko; and Nishizawa, Hitoshi, 4,927,517, Cl. 204-406.000.
Ohtaka, Masashi; and Miyahara, Kazuhiro, 4,927,577, Cl. 264-63.000.
Nguyen, Bich-Yen: *See—*
Roth, Scott S.; Nguyen, Bich-Yen; Tobin, Philip J.; Ray, Wayne; Wachholz, E. Petyr; and Wissen, Glenn, 4,927,780, Cl. 437-69.000.
Nguyen, Chinh, to SGS-Thomson Microelectronics SRL. CMOS read-only memory with static operation. 4,928,261, Cl. 365-104.000.
Niagara Mohawk Power Corporation: *See—*
Pietras, Eugene E., 4,926,900, Cl. 137-385.000.
Nichol, Thomas W.; Gisske, Edward T.; and Johnson, Arlyn, to Nichol, Thomas W.; and Johnson, Arlyn. Electronic bag toss game with light-activated detection. 4,927,160, Cl. 273-371.000.
Nichols, Lawrence J.: *See—*
MacMaster, George H.; and Nichols, Lawrence J., 4,928,070, Cl. 330-43.000.
Nicholson, Richard J. Method and apparatus for piping support. 4,927,103, Cl. 248-62.000.
Nielsen, Edward L.: *See—*
Buechele, James L.; Nielsen, Edward L.; Dong, Walter; and Shaw, Paul V., 4,927,978, Cl. 568-724.000.
Nielson, Marlin C.; and Woodruff, Kenneth R., to International Business Machines Corporation. Fast processor for multi-bit error correction codes. 4,928,280, Cl. 371-39.100.
Niemeyer, Robin N.: *See—*
Vriezen, John J.; and Niemeyer, Robin N., 4,928,222, Cl. 364-200.000.
Nieppola, Heikki. Exercise apparatus. 4,927,135, Cl. 272-63.000.
NIFCO, Inc.: *See—*
Ohkawa, Toshiya; Nakayama, Hiromichi; and Iguchi, Tatsuya, 4,927,287, Cl. 403-408.100.
Nihon Kohden Corporation: *See—*
Miyajima, Nobukazu; Tanaka, Akira; and Shinoda, Masaru, 4,926,862, Cl. 428-419.00D.
Nihon Parkerizing Co., Ltd.: *See—*
Matsushima, Yasunobu; Tanaka, Shigeo; Aoki, Tomoyuki; and Ono, Yohji, 4,927,472, Cl. 148-261.000.
Niikawa, Takeshi, to Brother Kogyo Kabushiki Kaisha. Printer having a device for adjusting the printing condition, depending upon paper thickness. 4,927,277, Cl. 400-56.000.
Niikawa, Tomohiko: *See—*
Nasu, Kazuhiko; Kenmochi, Kazuei; Niikawa, Tomohiko; and Matsui, Atsushi, 4,927,580, Cl. 264-102.000.
Nikaido, Masaru: *See—*
Kimura, Sakae; Nikaido, Masaru; Yanagibashi, Katumi; Homma, Katsuhisa; and Ouchi, Yoshiaki, 4,928,034, Cl. 313-346.00R.
Nikka Co., Ltd.: *See—*
Kasai, Ryusuke, 4,927,677, Cl. 428-36.600.
Niksa, Andrew J.: *See—*
Turley, Homer L.; Niksa, Marilyn J.; Pohto, Gerald R.; and Niksa, Andrew J., 4,927,717, Cl. 429-27.000.
Niksa, Marilyn J.: *See—*
Turley, Homer L.; Niksa, Marilyn J.; Pohto, Gerald R.; and Niksa, Andrew J., 4,927,717, Cl. 429-27.000.
Nilssen, Ole K. Electronic ballast with lamp pre-conditioning. 4,928,039, Cl. 315-209.00R.
Nilsson, Torsten, to Petainer S.A. Container, method and apparatus for manufacturing the same. 4,927,591, Cl. 264-532.000.
Nimmey, Alan; and Hayes, Harry, to Colgate-Palmolive Company. Package for a flowable material susceptible to flavor loss. 4,927,058, Cl. 222-106.000.
Nintz, Eckhard: *See—*
Weber, Heinz; Nintz, Eckhard; Walter, Manfred; Ballweber, Dieter; and Ostermayer, Bertram, 4,927,859, Cl. 521-59.000.
Nippon Kokan Kabushiki Kaisha: *See—*
Miyashita, Tsuneo; Nishio, Hiroaki; Yabuta, Kazuya; and Takagi, Yoshio, 4,927,600, Cl. 419-49.000.
Ohta, Kazumi; Kawaguchi, Sotoaki; Doyama, Hisao; and Yano, Yutaka, 4,927,457, Cl. 75-10.630.
Takahashi, Shuzo; Tsuchida, Yutaka; Osada, Shiro; Hasebe, Nobuhisa; and Nakada, Masayuki, 4,926,925, Cl. 164-154.000.
Nippon Seiko Kabushiki Kaisha: *See—*
Matsuki, Masuo, 4,926,528, Cl. 24-640.000.
Nippon Sheet Glass Company, Ltd.: *See—*
Honjo, Seiichiro; Yamada, Kazuo; Fuchigami, Yasuhiro; and Mizusugi, Tetsuya, 4,927,443, Cl. 65-273.000.
Manabe, Seiichiro; and Nagashima, Yukihito, 4,927,446, Cl. 65-347.000.
Nippon Shinyaku Co., Ltd.: *See—*
Kise, Masahiro; Yoshimoto, Yoshihiko; Fujisawa, Hiroshi; Sasaki, Yasuo; and Yasufuku, Shoji, 4,927,835, Cl. 514-448.000.

Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Osaka, Shigemi; Hata, Kazuo; and Takahashi, Tsukasa, 4,927,560, Cl. 252-315.100.
Nippon Telegraph and Telephone Corporation: *See*—
Otsuji, Taiichi; and Narumi, Naoaki, 4,928,278, Cl. 371-1.000.
Saito, Kenichi; Wada, Koo; and Yoshizawa, Masahiro, 4,928,010, Cl. 250-310.000.
Nippon Thompson Co., Ltd.: *See*—
Mottate, Tatsuo, 4,927,273, Cl. 384-45.000.
Nippondesso Co., Ltd.: *See*—
Ito, Yoshiaki; Nagai, Kougi; Sawada, Akihiko; and Koike, Hideyuki, 4,927,338, Cl. 417-462.000.
Ohara, Toshio; and Yamauchi, Yoshiyuki, 4,926,932, Cl. 165-111.000.
Yoshimi, Tomohisa; Kodama, Satoru; Yoshinori, Takeshi; and Ito, Masahiko, 4,928,090, Cl. 340-575.000.
Nishida, Kozi: *See*—
Anzai, Hisao; Makino, Hideaki; Ootani, Masami; Sasaki, Isao; and Nishida, Kozi, 4,927,893, Cl. 525-378.000.
Nishida, Shoji, to Canon Kabushiki Kaisha. Process for the formation of a silicon-containing semiconductor thin film by chemically reacting active hydrogen atoms with liqefied film-forming raw material gas on the surface of a substrate. 4,927,786, Cl. 437-233.000.
Nishida, Yutaka: *See*—
Sugiura, Itsuo; Nishida, Yutaka; Ito, Kaoru; and Ozaki, Toshiyuki, 4,927,266, Cl. 356-243.000.
Nishide, Hiroo; and Kaneko, Shintaro, to Fuji Xerox Co., Ltd. Electrophotographic method. 4,927,725, Cl. 430-54.000.
Nishikawa, Masayuki; Miyazaki, Takeshi; Shigeki, Terumitsu; Mitzutani, Satoshi; and Isono, Toru, to Toyoda Gosei Co., Ltd. Hose fitting. 4,927,190, Cl. 285-175.000.
Nishikawa, Seigo: *See*—
Hara, Masaaki; Nishikawa, Seigo; Tazaki, Taketoshi; and Inokuchi, Hiroshi, 4,926,604, Cl. 51-165.880.
Nishikawa, Shoji; Ohkura, Akira; and Ichida, Katsuya, to Toyota Jidosha Kabushiki Kaisha. Guide device for automated guided vehicle. 4,926,958, Cl. 180-168.000.
Nishiki, Yoshinori; Nakamatsu, Shuji; and Shimamune, Takayuki, to Permelec Electrode Ltd. Electrode catalyst and method for production thereof. 4,927,800, Cl. 502-349.000.
Nishimoto, Seiichi: *See*—
Kagiya, Tsutomu; Abe, Mitsuyuki; Nishimoto, Seiichi; Shibamoto, Yuta; Shimokawa, Kazuhiro; Hisanaga, Yorisato; Nakada, Tatsuo; and Yoshizawa, Toru, 4,927,941, Cl. 548-264.800.
Nishimura, Yasuhiro: *See*—
Inagaki, Tetsuya; Tagashira, Eijiro; Takaya, Masahiro; and Nishimura, Yasuhiro, 4,927,817, Cl. 514-184.000.
Nishimura, Yukio: *See*—
Kobayashi, Masaharu; and Nishimura, Yukio, 4,928,185, Cl. 360-19.100.
Nishino, Yoshitaka; Sawa, Toshio; Ofisumi, Katsumi; and Itow, Hisao, to Hitachi, Ltd. Radioactivity reduction method of a nuclear power plant and a nuclear power plant reduced in radioactivity. 4,927,598, Cl. 376-306.000.
Nishio, Hiroaki: *See*—
Miyashita, Tsuneo; Nishio, Hiroaki; Yabuta, Kazuya; and Takagi, Yoshio, 4,927,600, Cl. 419-49.000.
Nishio, Tomonori: *See*—
Doi, Atsuhiro; and Nishio, Tomonori, 4,928,122, Cl. 346-160.000.
Nishiwaki, Ituo: *See*—
Iwanaga, Shin-ichiro; Matsunaga, Tatsuaki; Nishiwaki, Ituo; and Enyo, Hiroji, 4,927,738, Cl. 430-286.000.
Nishizawa, Hitoshi: *See*—
Mizutani, Yoshihiko; and Nishizawa, Hitoshi, 4,927,517, Cl. 204-406.000.
Nissan Motor Co., Ltd.: *See*—
Koyanagi, Haruo; Kumasaka, Hideyuki; Takao, Koji; and Noda, Tomohiko, 4,926,544, Cl. 29-703.000.
Makihara, Nobuo; and Tahara, Hideo, 4,927,392, Cl. 440-88.000.
Mihara, Teruyoshi; and Matsushita, Tsutomu, 4,928,159, Cl. 357-42.000.
Morizumi, Mitsuo; Omura, Kinya; Arita, Eriya; Furuya, Katsuji; Yasuda, Sakae; and Kodera, Masaya, 4,926,914, Cl. 141-59.000.
Sakuma, Yuichi, 4,926,635, Cl. 60-299.000.
Suzuki, Yutaka, 4,928,242, Cl. 364-424.030.
Nitta, Tomio, to Tokai Corp. Noncontrolling type valve. 4,927,747, Cl. 431-344.000.
NIX Company, Ltd.: *See*—
Tanaka, Hiroyuki, 4,928,298, Cl. 378-162.000.
Nobile, John R.: *See*—
Fastman, Arnold; and Nobile, John R., 4,926,787, Cl. 118-32.000.
Noda, Tomohiko: *See*—
Koyanagi, Haruo; Kumasaka, Hideyuki; Takao, Koji; and Noda, Tomohiko, 4,926,544, Cl. 29-703.000.
Noel, Jean P., to Rockwell-CIM. Centrifugal clutch for an actuator for rendering inoperative an automobile vehicle door latch. 4,926,986, Cl. 192-0.028.
Nogle, Scott G.; Pelley, Perry H., III; Flannagan, Stephen T.; and Engles, Bruce E., to Motorola, Inc. Memory using distributed data line loading. 4,928,268, Cl. 365-230.030.
Noguchi, Ichiro, to Diesel Kiki Co., Ltd. Control apparatus for automobile air-conditioners. 4,926,651, Cl. 62-133.000.
Nohren, Hubert: *See*—
Pfabe, Peter; and Nohren, Hubert, 4,928,130, Cl. 342-9.000.
Nokia Graetz: *See*—
Mayer, Uwe; and Tischer, Kurt-Manfred, 4,928,041, Cl. 315-366.000.
Schlipf, Michael, 4,928,035, Cl. 313-466.000.
Nolte, Duane R., to Marathon Electric Mfg. Corp. Enclosed switch contact assembly. 4,927,988, Cl. 200-80.00R.
Nomura, Masaki: *See*—
Sakamoto, Kiyoaki; Matsubara, Kenichi; Nakahara, Yasuhiro; and Nomura, Masaki, 4,927,531, Cl. 210-198.200.
Nomura, Yoshihiro; and Ohkubo, Yoichiro, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Catalytic combustion device. 4,927,353, Cl. 431-215.000.
Nonomura, Katsumi: *See*—
Higuchi, Mitsuhiro; Yamamoto, Hirofumi; Yamamoto, Osamu; Fujii, Shokichi; and Nonomura, Katsumi, 4,926,505, Cl. 4-247.000.
Nordson Corporation: *See*—
Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., 4,927,346, Cl. 425-81.100.
Noriyuki, Kishi: *See*—
Kazuo, Inoue; Noriyuki, Kishi; Masao, Kubodera; Eitetsu, Akiyama; Shigeto, Kashiwabara; and Osamu, Takizawa, 4,926,640, Cl. 60-602.000.
Norsolor: *See*—
Heim, Philippe; and Riess, Gerard, 4,927,867, Cl. 523-339.000.
Teyssie, Philippe; Varshney, Sunil K.; Jerome, Robert; and Fayt, Roger, 4,927,703, Cl. 428-220.000.
North American Dynamics: *See*—
Dodd, Richard E., 4,926,743, Cl. 89-40.140.
North American Mfg. Co.: *See*—
Watson, James E.; and Davies, Theodore E., 4,926,842, Cl. 126-360.00R.
North American Philips Corporation: *See*—
Golik, Stephen S., 4,927,219, Cl. 315-371.000.
Guerinot, William F.; Bradley, Ralph H.; and Troemel, Stephen T., 4,928,182, Cl. 358-245.000.
Northern Telecom Limited: *See*—
Debortoli, George; and Cristescu, Alex G., 4,927,375, Cl. 439-357.000.
Moore, Thomas E.; McEachern, James A.; and Wight, Mark S., 4,928,275, Cl. 370-102.000.
Northgate Research, Inc.: *See*—
Kriauciunas, G. Vincent; and Vance, Karen, 4,927,427, Cl. 606-128.000.
Northrop Corporation: *See*—
Smith, Robert L., 4,926,563, Cl. 33-293.000.
Notron Engineering AG: *See*—
Wagner, James L., 4,927,194, Cl. 292-128.000.
Nouvertne Werner: *See*—
Schreckenberg, Manfred; Dhein, Rolf; Rudolph, Hans; and Nouvertne Werner, 4,927,903, Cl. 528-176.000.
NOVATOME: *See*—
Cros, Alain, 4,927,597, Cl. 376-290.000.
Novo Industri A/S: *See*—
Aaslyng, Dorrit A.; Jensen, Georg W.; Schneider, Ib; and Schneider, Palle, 4,927,558, Cl. 252-174.120.
Novotny, Rudolph J., to United Technologies Corporation. Method of balancing blade gas turbine engine rotor. 4,926,710, Cl. 74-573.00R.
Nowitzki, Friedhelm: *See*—
Putz, Heinrich; Nowitzki, Friedhelm; Damm, Gunter; Bathelt, Hartmut; Kromer, Gunter; Hoffmann, Henning; and Pischke, Reiner, 4,926,634, Cl. 60-274.000.
Nozick, Jacques: *See*—
Allin, Jean-Claude; and Nozick, Jacques, 4,928,303, Cl. 379-93.000.
Numa, Nobushige: *See*—
Shibata, Terukazu; Numa, Nobushige; and Kawamura, Masafumi, 4,927,877, Cl. 525-7.000.
Nunez, German: *See*—
Kaufman, Howard H.; and Nunez, German, 4,927,214, Cl. 312-195.000.
Nunome, Hiromi: *See*—
Mori, Nobufumi; Muraishi, Katsuaki; Matsuda, Terumi; Ohnishi, Masahiro; Nunome, Hiromi; Koyama, Tadao; and Oikawa, Tetsuo, 4,928,016, Cl. 250-440.100.
Nutrasweet Company, The: *See*—
Barnett, Ronald E.; Dikeman, Roxane; Liao, Shyh-Yuan; Gill, John; and Pantaleone, David P., 4,927,654, Cl. 426-548.000.
Nuwayser, Elie S., to Biotek, Inc. Sustained release transdermal drug delivery composition. 4,927,687, Cl. 424-449.000.
N.V. Vandemoortele International: *See*—
van Opstal, Martin; Dewulf, Frans; Cleenewerck, Bernard; and Weber, Ernst, 4,927,544, Cl. 210-712.000.
O.D.L. S.r.l.: *See*—
Pensa, Carlo M., 4,927,335, Cl. 417-393.000.
O&K Orenstein & Koppel Aktiengesellschaft: *See*—
Johannsen, Karl, 4,926,571, Cl. 37-72.000.
Oats, Edwin O., to Roll-in-Sheet Inc. Apparatus for changing disposable bedding on a mattress. 4,926,513, Cl. 5-488.000.
Obayashi, Akira: *See*—
Sakai, Takeshi; Matsui, Susumu; Akiyoshi, Sumiko; and Obayashi, Akira, 4,927,753, Cl. 435-26.000.
Sakai, Takeshi; Yokota, Hiroko; Yamamoto, Kazuki; Yokoyama, Sadaji; Matsui, Susumu; Kato, Ikunoshin; and Obayashi, Akira, 4,927,767, Cl. 436-64.000.

Oberg, Gordon D. Apparatus for recycling oil filters. 4,927,085, Cl. 241-36.000.
Oberg, Paul E. Pendulous accelerometer and/or inclinometer. 4,926,690, Cl. 73-514.000.
Oblovatsky, Anatoly K.: *See*—
Komarov, Alexandr N.; Shevtsov, Vitaly T.; Zema, Viktor E.; Lebedik, Grigory L.; Zema, Evgeny M.; Nedorezov, Vladimir A.; Oblovatsky, Anatoly K.; Drozdov, Boris Y.; Zezjulinsky, Andrei A.; Kovalenko, Sergei V.; Litvin, Alexandr N.; Yatsenko, Vladislav P.; and Katunin, Alexandr N., 4,927,121, Cl. 267-47.000.
Obrecht, Daniel: *See*—
Fischli, Albert; Gutknecht, Eva-Maria; and Obrecht, Daniel, 4,927,958, Cl. 560-53.000.
O'Brian, Lynwood. Sliding leg bodywork table. 4,927,128, Cl. 269-322.000.
O'Brien, Robert B.: *See*—
D'Orazio, Vincent T.; and O'Brien, Robert B., 4,927,643, Cl. 426-1.000.
Ochiai, Kumi; Horie, Hiromichi; Arima, Itsuo; and Morita, Mikio, to Kabushiki Kaisha Toshiba. Compressed magnetic powder core. 4,927,473, Cl. 148-306.000.
Odaka, Seiya, to Akebono Brake Industry Co., Ltd. Disk brake of a pin type. 4,926,979, Cl. 188-73.440.
Ogawa, Hiroshi: *See*—
Chino, Naoyoshi; Sato, Tsunehiko; Saito, Shinji; and Ogawa, Hiroshi, 4,927,665, Cl. 427-131.000.
Ogawa, Kohji; and Onoki, Mikio, to Mitsubishi Denki Kabushiki Kaisha. Videophone with detachable TV camera. 4,928,300, Cl. 379-53.000.
Ogawa, Masaharu, to Fuji Photo Film Co., Ltd. Process and apparatus for drying coated web. 4,926,567, Cl. 34-23.000.
Ogawa, Soichiro: *See*—
Kawabata, Kenji; Ogawa, Soichiro; and Masaki, Ryoichi, 4,928,037, Cl. 315-127.000.
Ogg, Graeme J.: *See*—
Costello, Anthony W.; Ogg, Graeme J.; and McGregor, John C., 4,926,614, Cl. 53-434.000.
Ogino, Masaaki: *See*—
Nakamura, Hisashi; Takahashi, Satoshi; Ikeda, Takayuki; and Ogino, Masaaki, 4,926,902, Cl. 137-493.300.
Ogino, Nobuyosi: *See*—
Arima, Noburu; Ogino, Nobuyosi; and Kimura, Hirosi, 4,926,793, Cl. 118-730.000.
Ogiro, Kenji: *See*—
Kaku, Nobuyuki; Shigemura, Tatsuya; Uesugi, Masaki; Kano, Kiyoshi; and Ogiro, Kenji, 4,928,191, Cl. 360-85.000.
Ogoe, Samuel A.; and Ho, Thoi H., to Dow Chemical Company, The. Ignition resistant modified thermoplastic composition. 4,927,870, Cl. 524-140.000.
Oh, Ju Y.: *See*—
Park, Won B.; and Oh, Ju Y., 4,928,197, Cl. 360-132.000.
O'Hara, Thomas J.: *See*—
Chaney, Earl J., Jr.; Malay, Manuel R.; O'Hara, Thomas J.; and Ayers, Alan D., 4,927,720, Cl. 429-54.000.
Ohara, Toshio; and Yamauchi, Yoshiyuki, to Nippondenso Co., Ltd. Plate type heat exchanger. 4,926,932, Cl. 165-111.000.
Ohashi, Hiromichi: *See*—
Nakagawa, Akio; Ohashi, Hiromichi; Yamaguchi, Yoshihiro; Watanabe, Kiminori; and Thukakoshi, Thuneo, 4,928,155, Cl. 357-23.400.
Ohba, Yasuo: *See*—
Kushibe, Mitsuhiro; Eguchi, Kazuhiro; Funamizu, Masahisa; and Ohba, Yasuo, 4,928,285, Cl. 372-45.000.
Ohbayashi, Masaru: *See*—
Konishi, Masataka; Shimizu, Keiko; Ohbayashi, Masaru; Tomita, Koji; Miyaki, Takeo; and Oki, Toshikazu, 4,927,848, Cl. 514-453.000.
Ohi Seisakusho Co., Ltd.: *See*—
Honma, Mikio, 4,926,987, Cl. 192-8.00C.
Ohkawa, Kiyomi: *See*—
Koshizawa, Toshifumi; Ohkawa, Kiyomi; and Horiuchi, Teruhiko, 4,926,994, Cl. 192-110.00R.
Ohkawa, Toshiya; Nakayama, Hiromichi; and Iguchi, Tatsuya, to NIFCO, Inc. Fastener for fastening plates together. 4,927,287, Cl. 403-408.100.
Ohkubo, Yoichiro: *See*—
Nomura, Yoshihiro; and Ohkubo, Yoichiro, 4,927,353, Cl. 431-215.000.
Ohkura, Akira: *See*—
Nishikawa, Shoji; Ohkura, Akira; and Ichida, Katsuya, 4,926,958, Cl. 180-168.000.
Ohlendorf, Dieter: *See*—
Bahr, Christian; Heppke, Gerd; Lotzsch, Detlef; Dubal, Hans-Rolf; Escher, Claus; and Ohlendorf, Dieter, 4,927,244, Cl. 350-350.00S.
Ohmae, Tsutomu: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.
Ohmori, Koichi: *See*—
Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Yamamoto, Osamu; and Watanabe, Hiroshi, 4,928,297, Cl. 378-146.000.
Ohmura, Hiroshi; and Nakashima, Takashi, to Mazda Motor Corporation. Rear wheel steering apparatus for automobile. 4,926,955, Cl. 180-140.000.
Ohnishi, Masahiro: *See*—
Mori, Nobufumi; Muraishi, Katsuaki; Matsuda, Terumi; Ohnishi, Masahiro; Nunome, Hiromi; Koyama, Tadao; and Oikawa, Tetsuo, 4,928,016, Cl. 250-440.100.
Ohori, Yoshiji; and Harazoe, Hirofumi, to Mitsui Petrochemical Industries, Ltd. Process for producing modified ultrahigh-molecular-weight polyolefins. 4,927,871, Cl. 524-230.000.
Ohsumi, Katsumi: *See*—
Nishino, Yoshitaka; Sawa, Toshio; Ohsumi, Katsumi; and Itow, Hisao, 4,927,598, Cl. 376-306.000.
Ohta, Kazumi; Kawaguchi, Sotoaki; Doyama, Hisao; and Yano, Yutaka, to Nippon Kokan Kabushiki Kaisha. Method of manufacturing low carbon ferro-chromium. 4,927,457, Cl. 75-10.630.
Ohtaka, Masashi; and Miyahara, Kazuhiro, to NGK Insulators, Ltd. Process for firing ceramic honeycomb structural bodies. 4,927,577, Cl. 264-63.000.
Ohtaka, Shoichi; and Igarashi, Hisashi, to Honda Giken Kogyo K.K. (Honda Motor Co., Ltd. in English). Air-fuel ratio feedback control method for internal combustion engines. 4,926,825, Cl. 123-489.000.
Ohtsu, Akira: *See*—
Kitahara, Shigehisa; Ohtsu, Akira; and Fujii, Katsuhiko, 4,927,808, Cl. 514-19.000.
Ohue, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Two-way CATV system using frequency division multiplexing. 4,928,272, Cl. 370-50.000.
Ohwada Carbon Industrial Co., Ltd.: *See*—
Takei, Makoto; and Tamura, Mamoru, 4,927,345, Cl. 424-4.000.
Oikawa, Tetsuo: *See*—
Mori, Nobufumi; Muraishi, Katsuaki; Matsuda, Terumi; Ohnishi, Masahiro; Nunome, Hiromi; Koyama, Tadao; and Oikawa, Tetsuo, 4,928,016, Cl. 250-440.100.
Oka Tateki: *See*—
Okamoto, Hiroshi; Oka Tateki; Sako, Mineyuki; Kyogoku, Tetsuo; and Suzuki, Toshikazu, 4,928,145, Cl. 355-245.000.
Oka, Tetsuo: *See*—
Mizukami, Toru; Katsumata, Ryoichi; and Oka, Tetsuo, 4,927,758, Cl. 435-107.000.
Okada, Masaki, to Isuzu Motors Limited. Heater device for motor vehicle. 4,927,077, Cl. 237-2.00A.
Okamoto, Akio: *See*—
Kumani, Hiroo; and Okamoto, Akio, 4,927,651, Cl. 426-324.000.
Okamoto, Hiroshi; Oka Tateki; Sako, Mineyuki; Kyogoku, Tetsuo; and Suzuki, Toshikazu, to Minolta Camera Kabushiki Kaisha. Developing apparatus having a bucket roller with movable buckets. 4,928,145, Cl. 355-245.000.
Okamoto, Yuji, to Sharp Kabushiki Kaisha. Image forming apparatus with image erasing lamp. 4,928,143, Cl. 355-218.000.
Okawa, Masayuki: *See*—
Tsujimura, Osamu; Nakayama, Masaaki; and Okawa, Masayuki, 4,927,303, Cl. 408-223.000.
Okazima, Hideo: *See*—
Kaieda, Shozo; Kurashima, Ikuo; Okazima, Hideo; and Mai, Jun, 4,928,055, Cl. 323-300.000.
O'Keefe, Sheila: *See*—
Miles, Philip D.; Moody, John R., Jr.; and O'Keefe, Sheila, 4,928,062, Cl. 324-158.00R.
O'Kennedy, Richard: *See*—
Reading, Christopher L.; Smyth, Malcolm R.; and O'Kennedy, Richard, 4,927,502, Cl. 204-153.100.
Oki Electric Industry Co.: *See*—
Onozawa, Kazuo, 4,928,131, Cl. 342-188.000.
Oki Electric Industry Co., Ltd.: *See*—
Aoki, Kazuo; Chiba, Toshimi; Tachibana, Sadao; and Nagatomo, Yasushi, 4,927,990, Cl. 200-517.000.
Oki, Toshikazu: *See*—
Konishi, Masataka; Shimizu, Keiko; Ohbayashi, Masaru; Tomita, Koji; Miyaki, Takeo; and Oki, Toshikazu, 4,927,848, Cl. 514-453.000.
Okimoto, Haruo: *See*—
Tadokoro, Tomoo; Tashima, Seiji; Okimoto, Haruo; Akagi, Toshimichi; Nakao, Masami; Matsuda, Ikuo; and Suekuni, Einosuke, 4,926,636, Cl. 60-312.000.
Oku, Hideaki: *See*—
Ikebe, Yo; and Oku, Hideaki, 4,928,009, Cl. 250-231.130.
Okuda, Hiroshi, to Fujitsu Limited. Semiconductor substrate comprising wafer substrate and compound semiconductor layer. 4,927,471, Cl. 148-33.500.
Okumura, Katsuya; Kuriyama, Fumio; Murai, Yukio; Tsujimura, Manabu; and Sobukawa, Hiroshi, to Toshiba Corp.; and Ebara Corp. Turbomolecular pump and method of operating the same. 4,926,648, Cl. 62-55.500.
Okumura, Mitsuhiro: *See*—
Naya, Eizo; Okumura, Mitsuhiro; and Miyamoto, Seiichi, 4,927,989, Cl. 200-265.000.
Okumura, Shinichiro: *See*—
Shibata, Katsuhiro; Azuma, Yuichi; Inoue, Masao; and Okumura, Shinichiro, 4,926,978, Cl. 188-73.100.
Okumura, Yoshiharu: *See*—
Takatsuna, Kazutoshi; Shiozawa, Kouji; and Okumura, Yoshiharu, 4,927,953, Cl. 556-413.000.
Olin Corporation: *See*—
Boudakian, Max M.; and Fidler, Delmer A., 4,927,940, Cl. 548-263.200.
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,926,632, Cl. 60-203.100.

Watson, Gary W.; Cheskis Harvey P.; and Sankaranarayanan, Ashok, 4,926,927, Cl. 164-429.000.

Olper, Marco; and Fracchia, Pierluigi, to Engitec Impianti S.p.A. Hydrometallurgical process for recovering in pure metal form all the lead contained in the active mass of exhausted batteries. 4,927,510, Cl. 204-114.000.

Olsen, Albert B.: *See*—
Gale, Edwin J.; Olsen, Albert B.; and Dinsmoor, John C., 4,928,202, Cl. 361-215.000.

Olsen, Mark W.; and Winegardner, John B., to Lennox Industries, Inc. Two way flow control device. 4,926,658, Cl. 62-324.100.

Olson, John E., to Cascade Corporation. Autcmatic load push-pull slipsheet handler. 4,927,320, Cl. 414-786.000.

Olympus Optical Co., Ltd.: *See*—
Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Hasegawa, Jun; Sasaki, Masahiko; Sasagawa, Katsuyoshi; and Yamashita, Shinji, 4,928,172, Cl. 358-98.000.
Yunoki, Yutaka, 4,928,190, Cl. 360-66.000.

Oman, Paul S. Microcomputer-based nerve and muscle stimulator. 4,926,865, Cl. 128-421.000.

Omnium de Traitements et de Valorisation (OTV): *See*—
Bablon, Guy P.; and Desbos, Gilbert, 4,927,543, Cl. 210-711.000.

Omron Tateisi Electronics Co.: *See*—
Shiga, Toshikazu; and Suzaki, Takuji, 4,927,264, Cl. 356-41.000.
Yui, Eiichi, 4,928,305, Cl. 379-98.000.

Omura, Kinya: *See*—
Morizumi, Mitsuo; Omura, Kinya; Arita, Eriya; Furuya, Katsuji; Yasuda, Sakae; and Kodera, Masaya, 4,926,914, Cl. 141-59.000.

Omura, Tadao: *See*—
Imoto, Koji; Omura, Tadao; Kataoka, Yoichi; Nakajima, Kunihiko; Maekawa, Motoyuki; Tamura, Hiroki; and Shioya, Yoshiaki, 4,926,817, Cl. 123-292.000.

Onitsuka, Yoshihiro: *See*—
Taniguchi, Osamu; Onitsuka, Yoshihiro; and Mihara, Tadashi, 4,927,243, Cl. 350-350.00S.

Ono, Yohji: *See*—
Matsushima, Yasunobu; Tanaka, Shigeo; Aoki, Tomoyuki; and Ono, Yohji, 4,927,472, Cl. 148-261.000.

Onoda, Kazuo: *See*—
Hayakawa, Futomi; and Onoda, Kazuo, 4,928,210, Cl. 362-217.000.

Onoki, Mikio: *See*—
Ogawa, Kohji; and Onoki, Mikio, 4,928,300, Cl. 379-53.000.

Onozawa, Kazuo, to Oki Electric Industry Co. Sea clutter suppression radar. 4,928,131, Cl. 342-188.000.

Ooms, Willem; Moss, Frank R.; and Key, Jonnie L., to Porelon, Inc. Microporous marking structures. 4,927,695, Cl. 428-159.000.

Ootani, Masami: *See*—
Anzai, Hisao; Makino, Hideaki; Ootani, Masami; Sasaki, Isao; and Nishida, Kozi, 4,927,893, Cl. 525-378.000.

Ophthalmic Ventures Limited Partnership: *See*—
Richards, William D., 4,927,428, Cl. 606-148.000.

Oppenheim, A. K.; Stewart, H. E.; and Hom, K., to University of California, The Regents of the. Pulsed jet combustion geserator for premixed charge engines. 4,926,818, Cl. 123-297.000.

Optische Werke G. Rodenstock: *See*—
Melzig, Manfrec; Rosler, Horst; and Schobl, Medardus, 4,927,239, Cl. 350-165.000.

Orbital Engine Co., Proprietary Limited: *See*—
Ahern, Steven R.; Brooks, Roy S.; and Cebis, Martin J. P., 4,926,806, Cl. 123-179.00L.

Orient Chemical Industries, Ltd.: *See*—
Senshu, Hisashi; and Otsuka, Masahiro, 4,927,538, Cl. 210-634.000.

Orlando, Franklin P.: *See*—
Butler, Lee D.; Orlando, Franklin P.; and Lenker, Don H., 4,927,440, Cl. 56-12.800.

Orndorff, Karl B.: *See*—
Morris, Arnold M.; D'Zurko, Daphne; Pilsbury, Richard H.; Barkell, J. Warren, Jr.; Orndorff, Karl B.; and Lawson Randall S., 4,926,974, Cl. 187-52.0LC.

Ortiz, Angel L., Jr.; and Jones, Marshall G., to General Electric Company. Lensless multifiber output coupler. 4,927,224, Cl. 350-96.150.

Ortiz, Angel L., Jr., to General Electric Company. Multiplexer for high power CW lasers. 4,927,226, Cl. 455-611.000.

O'Ryan, David E.: *See*—
Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., 4,927,346, Cl. 425-81.100.

Osada, Shiro: *See*—
Takahashi, Shuzo; Tsuchida, Yutaka; Osada, Shiro; Hasebe, Nobuhisa; and Nakada, Masayuki, 4,926,925, Cl. 164-154.000.

Osaka Gas Co., Ltd.: *See*—
Otsuka, Tetsuji; Shinozaki, Kenichi; Toyoyama, Kenji; and Ishihara, Shinobu, 4,927,356, Cl. 431-351.000.

Osaka, Shigemi; Hata, Kazuo; and Takahashi, Tsukasa, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Method for production of inorganic minute globular particles. 4,927,560, Cl. 252-315.100.

Osamu, Takizawa: *See*—
Kazuo, Inoue; Noriyuki, Kishi; Masao, Kubodera; Eitetsu, Akiyama; Shigeto, Kashiwabara; and Osamu, Takizawa, 4,926,640, Cl. 60-602.000.

Osmonson, Daniel T.; and McNulty, James L., to Krohm, Inc. Temporary enclosure structure. 4,926,892, Cl. 135-103.000.

Osprey Metals Ltd.: *See*—
Brooks, Reginald G.; Leatham, Alan; and Coombs, Jeffrey, 4,926,923, Cl. 164-5.000.
Brooks, Reginald G.; Leathman, Alan; and Coombs, Jeffrey, 4,926,924, Cl. 164-5.000.

Ostendorf, Daniel I.: *See*—
Revis, Jack W.; Sagel, John A.; and Ostendorf, Daniel I., 4,927,557, Cl. 252-174.150.

Osteo-Technology, Inc.: *See*—
Brandenburger, Gary H., 4,926,870, Cl. 128-660.010.

Ostermayer, Bertram: *See*—
Weber, Heinz; Nintz, Eckhard; Walter, Manfred; Ballweber, Dieter; and Ostermayer, Bertram, 4,927,859, Cl. 521-59.000.

Otis Elevator Company: *See*—
Bruehl, Klaus; and Thaler, Dietmar, 4,926,981, Cl. 188-111.000.

Otsuji, Taiichi; and Narumi, Nsoaki, to Nippon Telegraph and Telephone Corporation. IC test system. 4,928,278, Cl. 371-1.000.

Otsuka, Kiyotaka; and Wataya, Hideji, to Matsushita Electric Works, Ltd. Cutting head for reciprocatory-type dry shavers. 4,926,552, Cl. 30-43.920.

Otsuka, Masahiro: *See*—
Senshu, Hisashi; and Otsuka, Masahiro, 4,927,538, Cl. 210-634.000.

Otsuka, Tetsuji; Shinozaki, Kenichi; Toyoyama, Kenji; and Ishihara, Shinobu, to Osaka Gas Co., Ltd. Gas burner. 4,927,356, Cl. 431-351.000.

Ottenreuther, Josef: *See*—
Breitenbach, Otto; Hetz, Helmar; Rous, Friedemann; and Ottenreuther, Josef, 4,927,570, Cl. 264-1.400.

Ouchi, Yoshiaki: *See*—
Kimura, Sakae; Nikaido, Masaru; Yanagibashi, Katumi; Homma, Katsuhisa; and Ouchi, Yoshiaki, 4,928,034, Cl. 313-346.00R.

Outboard Marine Corporation: *See*—
Bland, Gerald F.; and Sullivan, Donald K., 4,927,391, Cl. 440-84.000.
Lathers, Michael W., 4,926,783, Cl. 114-363.000.

Ouzts, Johnny D.: *See*—
Hamilton, Frank S.; Ouzts, Johnny D.; and Mabry, Ray W., 4,926,795, Cl. 119-3.000.

Owen, Hartley: *See*—
Haddad, James H.; and Owen, Hartley, 4,927,527, Cl. 208-161.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,927,522, Cl. 208-120.000.

Owen, Raymond E., to Process Automation Business, Inc. Dual wedge flow element. 4,926,698, Cl. 73-861.610.

Owens, George W. Window pivot corner. 4,926,524, Cl. 16-386.000.

Owens-Illinois Plastic Products Inc.: *See*—
Cramer, Harley L., 4,927,040, Cl. 220-5.00R.

Oy Alu AB: *See*—
Vocke, Henning L.; and Saarenko, Pauli, 4,926,843, Cl. 126-390.000.

Oy Tampella AB: *See*—
Hamala, Sirpa; Heikkila, Matti; Laine, Jouko; Kokkonen, Kari; and Kenakkala, Timo, 4,927,613, Cl. 423-244.000.

Oyama, Hiroo, to Stanley Electric Co., Ltd. Vehicle front lamp. 4,928,214, Cl. 362-61.000.

Oyama, Noboru: *See*—
Yamaguchi, Shuichiro; Uchida, Naoto; Shimomura, Takeshi; and Oyama, Noboru, 4,927,516, Cl. 204-403.000.

Ozaki, Toshiyuki: *See*—
Sugiura, Itsuo; Nishida, Yutaka; Ito, Kaoru; and Ozaki, Toshiyuki, 4,927,266, Cl. 356-243.000.

Ozawa, Masakuni: *See*—
Matsumoto, Shinichi; Miyoshi, Naoto; Kimura, Mareo; Ozawa, Masakuni; and Isogai, Akio, 4,927,799, Cl. 502-303.000.

Ozawa, Yasuo: *See*—
Sakakibara, Koichi; and Ozawa, Yasuo, 4,927,248, Cl. 350-452.000.

Paige Manufacturing Company, Inc.: *See*—
Dickie, Robert G., 4,927,373, Cl. 439-188.000.
Dickie, Robert G., 4,927,376, Cl. 439-484.000.

Paktec Automation: *See*—
Zielke, Darrell W.; and Dean, Kenneth D., 4,926,616, Cl. 53-585.000.

Palazzo, David T. Method of making double wall storage tank for liquids from a metal tank having a patterned surface. 4,927,050, Cl. 220-445.000.

Pall Corporation: *See*—
Cordes, Harry D.; Duich, Michael B.; and Bailey, Gardner S., 4,927,434, Cl. 55-20.000.

Palm, Bengt, to Alfa-Laval Food & Dairy Engineering AB. Method and a device for aseptic transfer of an amount of liquid from one space to another. 4,926,913, Cl. 141-1.000.

Palmieri, Joseph M.: *See*—
Jacobs, Linda Y.; Palmieri, Joseph M.; and Smith, James I., 4,928,080, Cl. 335-202.000.

Palochak, John B. Ice shaving system. 4,927,087, Cl. 241-100.500.

Palylyk, Richard A.: *See*—
Franklin, Douglas E.; Murphy, Maurice W.; and Palylyk, Richard A., 4,926,691, Cl. 73-579.000.

Panavision, Inc.: *See*—
Kline, Donald, 4,928,171, Cl. 358-97.000.

Panson, Armand J., to Westinghouse Electric Corp. Etching process for zirconium metallic objects. 4,927,492, Cl. 156-642.000.

Pantaleone, David P.: *See*—
Barnett, Ronald E.; Dikeman, Roxane; Liao, Shyh-Yuan; Gill, John; and Pantaleone, David P., 4,927,654, Cl. 426-548.000.

Papantoniou, Christos: *See*—
Lapoiriere, Claudine; Mahieu, Claude; and Papantoniou, Christos, 4,927,883, Cl. 525-154.000.

Papastavros, Demos. Power plant with medium and low power plant systems. 4,926,644, Cl. 60-715.000.

Pappalardo, Salvatore: *See*—
Pietrobon, Giovanni; Rossi, Domenico; and Pappalardo, Salvatore, 4,928,049, Cl. 318-685.000.

Pappas, Spilios A. Convertible billiard table. 4,927,140, Cl. 273-4.00R.

Papst-Motoren GmbH & Co. KG: *See*—
Doemen, Benno, 4,928,045, Cl. 318-464.000.

Papuchon, Michel; Pocholle, Jean-Paul; and Delacourt, Dominique, to Thomson-CSF. Frequency shifter for medium infrared range wave. 4,927,245, Cl. 350-354.000.

Papuchon, Michel: *See*—
Pocholle, Jean P.; Papuchon, Michel; Puech, Claude; and Tournois, Pierre, 4,927,223, Cl. 350-96.150.

Paranto, Arlen C. Novelty ball. 4,927,141, Cl. 273-58.00K.

Pardubicky, Jaroslav F.: *See*—
Grims, Conrad M.; Moen, Bruce A.; and Pardubicky, Jaroslav F., 4,926,669, Cl. 72-349.000.

Parekh, Raj B.: *See*—
Feder, Joseph; Howard, Susan C.; Wittwer, Arthur J.; Rademacher, Thomas W.; Parekh, Raj B.; and Dwek, Raymond A., 4,927,630, Cl. 424-94.640.

Park, Jore: *See*—
Fables, Wylci; and Park, Jore, 4,927,402, Cl. 446-487.000.

Park, Won B.; and Oh, Ju Y., to SKC Limited. Lock for video tape cassette. 4,928,197, Cl. 360-132.000.

Parker, Christopher; and Andrews, Gordon T., to New World Domestic Appliances Limited. Cooking ovens. 4,926,837, Cl. 126-21.00H.

Parker, Donald O. Apparatus and method for restarting a coin operated device after expiration of time. 4,926,997, Cl. 194-231.000.

Parker, Ronald N.: *See*—
Baglee, David A.; and Parker, Ronald N., 4,928,267, Cl. 365-218.000.

Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., to Dennison Manufacturing Company. Heat transferable laminate. 4,927,709, Cl. 428-352.000.

Parkinson, John E.: *See*—
Garth, Peter; Simpson, Stuart M.; Parkinson, John E.; and Rogers, Alan H., 4,927,741, Cl. 430-309.000.

Parnell, James A.; and Poole, Dan R., to Ametek, Inc. Digitizer for position sensing. 4,928,256, Cl. 364-561.000.

Parry, Keith P.; Worthington, Paul A.; and Rathmell, William G., to Imperial Chemical Industries PLC. Method of preventing fungal attack on wood, hides, leather or paint films using a triazole. 4,927,839, Cl. 514-383.000.

Parsons, Bryan N. V., to Jaguar Cars Limited. Internal combustion engines. 4,926,811, Cl. 123-193.00P.

Partyka, Richard A.: *See*—
Vyas, Dolatrai M.; Doyle, Terrence W.; and Partyka, Richard A., 4,927,943, Cl. 548-422.000.

Pasquale, Gary M.: *See*—
Anderson, Conroy D.; Chou, Tai-Sheng; Cormier, William E., Jr.; Dwyer, Francis G.; Krambeck, Frederick J.; Pasquale, Gary M.; Schipper, Paul H.; and Stover, William A., 4,927,526, Cl. 208-152.000.

Pastor, Walter. Gun grip emblem manual safety. 4,926,575, Cl. 42-70.060.

Pastrone, John; and Laenen, Edward, to Abbott Laboratories. Drive mechanism for disposable fluid infusion pumping cassette. 4,927,411, Cl. 604-65.000.

Pate, Kenneth D., Sr. High voltage insulative shaft coupler. 4,927,403, Cl. 464-30.000.

Patel, Arvind, to Molex Incorporated. Unitarily molded electrical connector housing with separable key. 4,927,787, Cl. 439-189.000.

Patel, Dakshesh S.: *See*—
Small, Richard F.; Patel, Dakshesh S.; Barrow, Lascelle A.; and Dix, Barry M., 4,927,663, Cl. 427-40.000.

Patel, Usha R.: *See*—
Abou-Gharbia, Magid A.; and Patel, Usha R., 4,927,934, Cl. 546-152.000.

Patera, Ginger E.; Janke, Larry L.; and Lampman, William T., to Whirlpool Corporation. Removable article holder for a dishwasher. 4,927,033, Cl. 211-41.000.

Patil, Prabhakar B.: *See*—
Burba, Joseph C.; Landman, Ronald G.; Patil, Prabhakar B.; and Reitz, Graydon A., 4,928,227, Cl. 364-424.010.

Patrician Corporation: *See*—
Provenzo, Eugene F., Jr.; and Zorn, Peter A., 4,927,100, Cl. 244-153.00R.

Patsch, Manfred: *See*—
Hackenberger, Alfred; and Patsch, Manfred, 4,927,935, Cl. 546-157.000.

Pattison, David C.: *See*—
Veerhusen, Dan S.; and Pattison, David C., 4,926,628, Cl. 60-39.150.

Pattner, Jacob J.: *See*—
Stein, Herman H.; Pattner, Jacob J.; and Crowley, Steven R., 4,927,807, Cl. 514-18.000.

Paul, Clarence A. Security safes for vehicles. 4,926,762, Cl. 109-51.000.

Paul Pleiger Maschinenfabrik GmbH & Co. KG: *See*—
Szewczyk, Mattias; and Poting, Hans-Jurgen, 4,926,803, Cl. 123-55.00R.

Pawlenko, Ivan: *See*—
Bond, Robert H.; and Pawlenko, Ivan, 4,926,538, Cl. 29-559.000.

Pawloski, James C., to Dow Chemical Company, The. Process and apparatus for sealing thermoplastic plies in laminated sheets having thickened sections. 4,927,474, Cl. 156-66.000.

Payne, Richard: *See*—
Hoyland, Trevor B.; and Payne, Richard, 4,927,000, Cl. 198-418.400.

Pearce, James H., III: *See*—
Ehret, Barbara A.; and Pearce, James H., III, 4,927,179, Cl. 283-79.000.

Pearce, John R.: *See*—
Griffin, Dennis; and Pearce, John R., 4,926,740, Cl. 89-1.819.

Pearlstine, Kathryn: *See*—
Lane, Gregg A.; and Pearlstine, Kathryn, 4,928,065, Cl. 324-464.000.

Pearman, Arthur N. J., to Gas Research Institute. Method and apparatus for proving electronic gas meters at low flow rates. 4,926,678, Cl. 73-3.000.

Pearson, Raymond J.: *See*—
Baker Mervyn R.; Pearson, Raymond J.; and Emsley, Roger, 4,926,967, Cl. 182-164.000.

Pease, Robert A., to National Semiconductor Corporation. Stabilized low dropout voltage regulator circuit. 4,928,056, Cl. 323-314.000.

Peck, Paul L., to Archery Designs, Inc. Ball bearing type bow string release. 4,926,835, Cl. 124-35.200.

Pelley, Perry H., III: *See*—
Nogle, Scott G.; Pelley, Perry H., III; Flannagan, Stephen T.; and Engles, Bruce E., 4,928,268, Cl. 365-230.030.

Penn's Woods Products, Inc.: *See*—
Mueller, Mark, 4,927,399, Cl. 446-207.000.

Pennwalt Corporation: *See*—
Bohen, Joseph M., 4,927,873, Cl. 524-288.000.
Dawn, Douglas D.; and Radermacher, Reinhard, 4,926,650, Cl. 62-114.000.
Kamath, Vasanth R.; and Sargent, James D., 4,927,891, Cl. 525-327.300.

Pensa, Carlo M., to O.D.L. S.r.l. Pump for transferring liquids, in particular beer or carbonated beverages. 4,927,335, Cl. 417-393.000.

Peplinski, Alphonso. Blind hole thread gauge. 4,926,700, Cl. 73-862.230.

Perchiazzi, Michele: *See*—
Volpe, Fulvio; and Perchiazzi, Michele, 4,928,208, Cl. 361-395.000.

Peres-Schael, Irene: *See*—
Chanock, Robert M.; Kapikian, Albert; Midthun, Karen; Flores, Jorge; Gorziglia, Mario; Hoshino, Yasutaka; and Peres-Schael, Irene, 4,927,628, Cl. 424-89.000.

Perfect Carton Corporation: *See*—
Platt, Ronald G., 4,927,008, Cl. 206-45.310.

Perfetti, Thomas J.: *See*—
King, Allen B.; and Perfetti, Thomas J., 4,927,176, Cl. 280-813.000.

Perkin-Elmer Corporation, The: *See*—
de Groot, Peter J.; Macomber, Steven H.; and Gallatin, Gregg M., 4,927,263, Cl. 356-5.000.
Pospisil, Peter; and Kolb, Bruno, 4,927,532, Cl. 210-198.200.

Perlman, Kato L.: *See*—
DeLuca, Hector F.; Schnoes, Heinrich K.; Perlman, Kato L.; and Kutner, Andrzej, 4,927,815, Cl. 514-167.000.

Permco, Inc.: *See*—
Lonsberry, Kenneth F., 4,927,343, Cl. 418-102.000.

Permelec Electrode Ltd.: *See*—
Nishiki, Yoshinori; Nakamatsu, Shuji; and Shimamune, Takayuki, 4,927,800, Cl. 502-349.000.

Perron, Paul R.: *See*—
Kramer, George C.; and Perron, Paul R., 4,927,806, Cl. 514-2.000.

Perron, Robert; and Mutez, Sylvain, to Rhone-Poulenc Chimie. Catalytic dimerization of alkyl acrylates. 4,927,957, Cl. 560-202.000.

Perrott, Charles H., to C. H. Perrott, Inc. Automatic fluid pressure equalizing valve. 4,926,897, Cl. 137-98.000.

Perry, David A.: *See*—
Dutton, Christopher J.; and Perry, David A., 4,927,847, Cl. 514-450.000.

Pesheck, Peter S.: *See*—
Wendt, Dan J.; Kemske, Jonathon D.; and Pesheck, Peter S., 4,927,991, Cl. 219-10.55E.

Petainer S.A.: *See*—
Nilsson, Torsten, 4,927,591, Cl. 264-532.000.

Petersen Manufacturing Co., Inc.: *See*—
Sorensen, Joseph A.; and Gatzemeyer, Dwight L., 4,926,722, Cl. 81-487.000.

Peterson, Charles D., Jr. Tightening device for threaded connectors. 4,927,305, Cl. 411-14.000.

Peterson, Stephen R.: *See*—
Marzalek, Michael S.; Peterson, Stephen R.; and Wendler, John A., 4,928,251, Cl. 364-484.000.

Petrak, Peter: *See*—
Stuber, Istvan; Nagy, Geza; and Petrak, Peter, 4,927,253, Cl. 350-508.000.

Petrovic, John J.; Carter, David H.; and Gac, Frank D., to United States of America, Energy. Molybdenum disilicide matrix composite. 4,927,792, Cl. 501-92.000.

Pettigrew, Robert M.; Humberstone, Victor C.; Gardner, Keith; Longman, Robert J.; and Helfet, Peter R., to Plasmon Data Systems. Optical data storage medium. 4,928,132, Cl. 346-135.100.

Pettman, Roger B.: *See*—
Wilson, John R. H.; and Pettman, Roger B., 4,927,840, Cl. 514-397.000.
Wilson, John R. H.; Pettman, Roger B.; and Reid, Derek J., 4,927,841, Cl. 514-400.000.

Petty, Herbert E.: *See*—
King, Roswell; E., III; Foster, George N.; and Petty, Herbert E., 4,927,898, Cl. 528-27.000.

Pfabe, Peter; and Nohren, Hubert, to Autoflug GmbH. Staggered arrangement for improving radar reflection. 4,928,130, Cl. 342-9.000.

Pfeifer & Langen: *See*—
Schwengers, Dieter, 4,927,756, Cl. 435-103.000.

Pfiester, James R.: *See*—
Alvis, John R.; Pfiester, James R.; and Holland, Orin W., 4,928,156, Cl. 357-23.400.

Pfister, Theodor: *See*—
Fest, Christa; Muller, Klaus-Helmut; Pfister, Theodor; Riebel, Hans-Jochem; Kysela, Ernst; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Robert H., 4,927,454, Cl. 71-93.000.

Pfizer Inc.: *See*—
Banks, Bernard J.; and Witty Michael J., 4,927,918, Cl. 536-7.100.
Dutton, Christopher J.; and Perry, David A., 4,927,847, Cl. 514-450.000.
Mathur, Krishna K.; Resnik, Robert K.; and Simmons, Randall G., 4,927,618, Cl. 423-432.000.

Pfrimmer, Donald R. Method of custom manufacturing shoes at a specified heel height. 4,927,584, Cl. 264-154.000.

Pharmacia ENI Diagnostics, Inc.: *See*—
Saxon, Ronald L.; Zeger, Leroy; and Horbatt, Kenneth, 4,927,765, Cl. 436-43.000.

Philip Morris Incorporated: *See*—
Harward, Charles N., 4,928,181, Cl. 358-230.000.

Phillips, Joseph R.: *See*—
Meredith, Michael D.; Phillips, Joseph R.; Laakso, Richard O.; and Stromberg, C. Bertil, 4,927,312, Cl. 414-221.000.

Phillips Petroleum Company: *See*—
Schirmer, Robert M.; Fromm, Ellsworth H.; and Alquist, Henry E., 4,927,349, Cl. 431-10.000.
Tabler, Donald C.; and Johnson, Marvin M., 4,927,795, Cl. 502-33.000.

Phipps, Jackie M.; and Barrier, Ronald B. Method of manufacturing a flow meter. 4,926,532, Cl. 29-25.350.

Picanol N.V.: *See*—
Shaw, Henry, 4,926,911, Cl. 139-435.100.

Piccioli, David P.: *See*—
Collette, Wayne N.; Krishnakumar, Suppayan M.; and Piccioli, David P., 4,927,680, Cl. 428-36.920.

Picker International, Inc.: *See*—
Lampman, David A.; Morich, Michael A; and Dannels, Wayne R., 4,928,063, Cl. 324-307.000.
Zupancic, Anton Z.; and Deucher, Joseph S., 4,928,292, Cl. 378-17.000.

Pidgeon, Charles, to Purdue Research Foundation. Method for solid phase membrane mimetics. 4,927,879, Cl. 525-54.100.

Pieper, Gunter: *See*—
Purrmann, Robert; Guggenberger, Rainer; and Pieper, Gunter, 4,927,866, Cl. 523-115.000.

Pieper, Jon R.: *See*—
Buchanan, Scott; Larson, Eric G.; Pieper, Jon R.; and Boettcher, Thomas E., 4,927,431, Cl. 51-298.000.

Pierdet, Andre : *See*—
Bouton, Marie-Madeleine; Jacques, Jean; and Pierdet, Andre , 4,927,975, Cl. 568-373.000.

Pierorazio, Donato A. Beach accessory device. 4,927,118, Cl. 248-545.000.

Pietramale, Anthony M.: *See*—
Schwarz. Albert J.; and Pietramale, Anthony M., 4,927,116, Cl. 251-312.000.

Pietras, Eugene E., to Niagara Mohawk Power Corporation. Valve assembly and locking means therefor. 4,926,900, Cl. 137-385.000.

Pietrobon, Giovanni; Rossi, Domenico; and Pappalardo, Salvatore, to SGS-Thomson Microelectronics SRL. Circuit for controlling current switching in multiple inductive loads, with single current detector, particularly for windings of step motors. 4,928,049, Cl. 318-685.000.

Pietzsch, Heiko: *See*—
Hemm, Gerhard; Clausing, Gerhard; and Pietzsch, Heiko, 4,927,028, Cl. 206-618.000.

Pilatowicz, Edward A.; Carsello, Anthony; and Landy, Richard, to Allegretti & Company. Hand held trimmer for cutting vegetation such as hedges and the like. 4,926,556, Cl. 30-216.000.

Pillsbury Company, The: *See*—
Wendt, Dan J.; Kemske, Jonathon D.; and Pesheck, Peter S., 4,927,991, Cl. 219-10.55E.

Pilsbury, Richard H.: *See*—
Morris, Arnold M.; D'Zurko, Daphne; Pilsbury, Richard H.; Barkell, J. Warren, Jr.; Orndorff, Karl B.; and Lawson Randall S., 4,926,974, Cl. 187-52.0LC.

Pimpinella, Richard J.; and Segelken, John M., to AT&T Bell Laboratories. Method of manufacturing optical assemblies. 4,926,545, Cl. 29-832.000.

Pinck, Peter: *See*—
Lorenzen, Heinz-Christen; Heitmann, Uwe; Siems, Wolfgang; and Pinck, Peter, 4,926,886, Cl. 131-84.400.

Pinol, Augusto C.: *See*—
Corominas, Juan P.; Constansa, Jordi F.; and Pinol, Augusto C., 4,927,926, Cl. 544-101.000.

Pioneer Electronic Corporation: *See*—
Akiyama, Toru, 4,928,166, Cl. 358-36.000.
Chikuma, Kiyofumi, 4,927,681, Cl. 428-64.000.
Iwashita, Kazuhiro, 4,928,168, Cl. 358-84.000.
Narumi, Ichiro, 4,927,235, Cl. 350-252.000.
Shiba, Takahumi, 4,928,044, Cl. 318-364.000.
Yamamoto, Hideo; Sato, Takeshi; Yoshimi, Toshikazu; Mori, Shuichi; and Tokumo, Akio, 4,928,071, Cl. 330-129.000.

Piotrowski, Paul A.: *See*—
Campbell, Robert B.; Kochka, Edgar L.; and Piotrowski, Paul A., 4,927,489, Cl. 156-620.100.

Pipkorn, David N.: *See*—
Howell, Margene C.; Katerberg, James A.; Pipkorn, David N.; and Wood, Wendell L., 4,928,113, Cl. 346-75.000.

Pirali, Edmund: *See*—
Wright, Geoffrey D.; and Pirali, Edmund, 4,926,969, Cl. 128-731.000.

Pirotzky, Eduardo; Dive, Georges; Godfroid, Jean-Jacques; and Heymans, Francoise, to Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.). 2-methoxycarbonyl substituted N,N'-di-(trimethoxybenzoyl) piperazines, process for preparing the same and therapeutical compounds containing them. 4,927,825, Cl. 514-255.000.

Pischke, Reiner: *See*—
Putz, Heinrich; Nowitzki, Friedhelm; Damm, Gunter; Bathelt, Hartmut; Kromer, Gunter; Hoffmann, Henning; and Pischke, Reiner, 4,926,634, Cl. 60-274.000.

Pitney Bowes Inc.: *See*—
Fassman, Arnold; and Nobile, John R., 4,926,787, Cl. 118-32.000.
Gasiunas, Donatas V.; and Storace, Anthony, 4,928,089, Cl. 340-870.310.

Piton, Claude; and Piton, Jacqueline. Marine anchor equipped with anchor weighing means. 4,926,779, Cl. 114-297.000.

Piton, Jacqueline: *See*—
Piton, Claude; and Piton, Jacqueline, 4,926,779, Cl. 114-297.000.

Pitt, Gilles D.; Jones, Roger E.; Antell, George R.; Spicer, Lyndon R.; Barnett, John A.; and Hill, Robert, to Standard Telephones Cables Public Limited Company. Method and arrangement for transmitting power in optical form over optical fibres. 4,928,319, Cl. 455-612.000.

Pitts, Robert W., to AMP Incorporated. Modular electrical connector assembly. 4,927,374, Cl. 439-310.000.

Plasmon Data Systems: *See*—
Pettigrew, Robert M.; Humberstone, Victor C.; Gardner, Keith; Longman, Robert J.; and Helfet, Peter R., 4,928,132, Cl. 346-135.100.

Platt, Richard B. Battery hold-down structure. 4,926,953, Cl. 180-68.500.

Platt, Ronald G., to Perfect Carton Corporation. Multi-celled paperboard container with v-shaped windows. 4,927,008, Cl. 206-45.310.

Platt, William J.; and Rose, Thomas E., to National Rolling Mills, Inc. Compression leg. 4,926,607, Cl. 52-484.000.

Plessey Overseas Limited: *See*—
Trundle, Clive; and Brettle, Jack, 4,927,180, Cl. 283-70.000.

Plumer, Hans J.: *See*—
Kross, Manfred; and Plumer, Hans J., 4,926,719, Cl. 81-57.370.

Plunkett, Allan B., to Synektron Corporation. Back EMF sampling circuit for phase locked loop motor control. 4,928,043, Cl. 318-254.000.

Pocholle, Jean P.; Papuchon, Michel; Puech, Claude; and Tournois, Pierre, to Thomson-CSF. Optic fiber correlator. 4,927,223, Cl. 350-96.150.

Pocholle, Jean-Paul: *See*—
Papuchon, Michel; Pocholle, Jean-Paul; and Delacourt, Dominique, 4,927,245, Cl. 350-354.000.

Podlesny, Daniel B.; and Lopez, Ralph, to Red Devil, Inc. Trowel. 4,926,519, Cl. 15-235.400.

Poehlein, Raymond E.; Reese, Franklin S.; and Adamek, John A., to Xerox Corporation. Buckle control for reducing interactions between media drive systems. 4,928,141, Cl. 355-208.000.

Poel, Hendrik: *See*—
Geertsma, Geert; Poel, Hendrik; and Weersink, Andreas, 4,926,550, Cl. 30-43.100.

Poelzing, Gerhard W., to AT&T Bell Laboratories. Method for encapsulating integrated circuits. 4,927,590, Cl. 264-272.170.

Poepsel, Donald A.: *See*—
Staab, Carl J.; Houser, Kirk D.; Jones, Donald J.; Ihrman, Robert T.; Poepsel, Donald A.; and Edblad, Warren A., 4,928,097, Cl. 340-825.500.

Pohl, Wolfgang: *See*—
Fauck, Gerhard; Pohl, Wolfgang; and Ulrich, Helmut, 4,926,907, Cl. 137-627.500.

Pohlig Ralf: *See*—
Brock, Martin; and Pohlig Ralf, 4,927,575, Cl. 264-46.400.

Pohto, Gerald R.: *See*—
Turley, Homer L.; Niksa, Marilyn J.; Pohto, Gerald R.; and Niksa, Andrew J., 4,927,717, Cl. 429-27.000.

Poirier, Joel: *See*—
Ciloglu, Cavit; Gagne, Martin; Laraque, Edy; Poirier, Joel; Tremblay, Sylvain; and Trudel, Yves, 4,927,461, Cl. 75-254.000.

Pokorny, Richard J., to Minnesota Mining and Manufacturing Company. Aqueous based composition containing dibasic ester and thickening agent for removing coatings. 4,927,556, Cl. 252-173.000.

Polan, George S., to Central Sprinkler Corporation. Pendent style sprinkler with cover. 4,926,946, Cl. 169-37.000.

Polczynski, Mark; and Krueger, Brian, to A. O. Smith Corporation. PC board panel configuration technique. 4,926,546, Cl. 29-840.000.

Polk, Gary C.; Larson, Steve A.; and Albrecht, Ronald E., to Power Flo Products Corp. Pressure washer. 4,926,904, Cl. 137-565.000.

Pollard, Andrew: *See*—
Spedding, Colin E.; and Pollard, Andrew, 4,927,124, Cl. 267-229.000.

Pollitt, Gary M. Hydraulic shock absorber with nonlinear properties. 4,926,984, Cl. 188-310.000.

Polly, Daniel R., to United States of America, Navy. Method for assessment of corrosion activity in reinforced concrete. 4,927,503, Cl. 204-153.110.

Polska Akademia Nauk Instytut Podstrowowych Problemow: *See*—
Brokowski, Andrzej; Deputat, Julian; and Mizerski, Krzysztof, 4,926,692, Cl. 73-597.000.

Poly Technologies, Inc.: *See*—
Ma, Bao P.; Shou-Fu, Zhong; and Li, Qin Z., 4,926,742, Cl. 89-33.020.

Polyplastics Co., Ltd.: *See*—
Nakane, Toshio; Hijikata, Kenji; Kageyama, Yukihiko; and Takahashi, Katsuhiko, 4,927,895, Cl. 525-438.000.

Polytechnic University: *See*—
Zabar, Zivan, 4,926,741, Cl. 89-8.000.

Pon, Charles K.: *See*—
Renga, James M.; Pon, Charles K.; Gulbenkian, Aylin H.; and Smith, Michael G., 4,927,508, Cl. 204-79.000.

Pool, James L., to Lisle Corporation. Tie rod and ball joint separator. 4,926,537, Cl. 29-275.000.

Poole, Dan R.: *See*—
Parnell, James A.; and Poole, Dan R., 4,928,256, Cl. 364-561.000.

Porelon, Inc.: *See*—
Ooms, Willem; Moss, Frank R.; and Key, Jonnie L., 4,927,695, Cl. 428-159.000.

Porter, Warren W.; and Lauffer, Donald K., to NCR Corporation. Foldable printed circuit board. 4,928,206, Cl. 361-385.000.

Porth, Wolfgang; Weibler, Wolfgang; Kern, Eckhart; Hannewald, Thomas; and Weingartner, Reiner, to VDO Adolf Schindling AG. Electronic controller for internal combustion engines. 4,926,821, Cl. 123-399.000.

Pospisil, Jirina V., to Unitek Corporation. Triwing orthodontic bracket. 4,927,360, Cl. 433-8.000.

Pospisil, Peter; and Kolb, Bruno, to Perkin-Elmer Corporation, The. Device for the compensation of the baseline drift of a chromatographic separating column. 4,927,532, Cl. 210-198.200.

Posse Lock Manufacturing Co., Ltd.: *See*—
Wu, Rong-Faa; and Wu, Shoei-Jyi, 4,927,195, Cl. 292-169.140.

Poting, Hans-Jurgen: *See*—
Szewczyk, Mattias; and Poting, Hans-Jurgen, 4,926,803, Cl. 123-55.00R.

Pouyez, Philippe: *See*—
Kayoun, Pierre; and Pouyez, Philippe, 4,928,135, Cl. 350-96.200.

Power Flo Products Corp.: *See*—
Polk, Gary C.; Larson, Steve A.; and Albrecht, Ronald E., 4,926,904, Cl. 137-565.000.

Powers, Edward J.: *See*—
Wadhwa, Lachhman; Bitritto, Michel; and Powers, Edward J., 4,927,909, Cl. 528-331.000.

Powertech Labs, Inc.: *See*—
Franklin, Douglas E.; Murphy, Maurice W.; and Palylyk, Richard A., 4,926,691, Cl. 73-579.000.

PPG Industries, Inc.: *See*—
Dana, David E.; and Morris, Steven J., 4,927,869, Cl. 523-502.000.
Kahle, Charles F., II; McCollum, Gregory J.; and Wilson, Craig A., 4,927,969, Cl. 564-377.000.
Leatherman, Dennis D., 4,927,802, Cl. 503-214.000.
Maska, Rudolf; and Essary, William A., 4,927,875, Cl. 524-457.000.
Schimmel, Karl F.; and Blackburn, William P., 4,927,868, Cl. 523-439.000.
Wiedrich, Charles R.; and Sare, Edward J., 4,927,546, Cl. 210-755.000.

Prats, Michael: *See*—
Glandt, Carlos A.; Vinegar, Harold J.; and Prats, Michael, 4,926,941, Cl. 166-248.000.

Precision Extruded Products, Inc.: *See*—
Markiewicz, James E.; and Shrontz, Darrell G., 4,926,667, Cl. 72-256.000.

Precision Fukuhara Works, Ltd.: *See*—
Takashi, Yamaoko, 4,926,660, Cl. 66-9.00R.

Preco Industries, Inc.: *See*—
Hodges, William L.; and Cheek, Patrick J., 4,928,243, Cl. 364-519.000.

Predelli, Piero. Spring-latch door lock provided with an improved locking system and adapted to be used for inwardly and outwardly opened doors. 4,927,197, Cl. 292-245.000.

Prescott, Robert C.; and Robinson, Robert J., to Dresser Industries, Inc. Sensitive electrical to mechanical transducer. 4,926,896, Cl. 137-82.000.

Price, Robert A., to G-P Manufacturing Co., Inc. Custom molded vehicle splash guard. 4,927,177, Cl. 280-851.000.

Priceman, Seymour, to Barson Corporation. Refractory metal composite coated article. 4,927,714, Cl. 428-628.000.

Prilik, Ronald J.: *See*—
Dampier, Michael S.; Prilik, Ronald J.; and Rapoport, Norman R., 4,928,061, Cl. 324-158.00F.

Princeton University, The Trustees of: *See*—
Taylor, Edward C.; Beardsley, George P.; Shih, Chuan; and Fletcher, Stephen R., 4,927,828, Cl. 514-258.000.

Pringle, Ronald E.; and Morris, Arthur J., to Camco, Incorporated. Subsurface well safety valve with curved flapper and method of making. 4,926,945, Cl. 166-321.000.

Process Automation Business, Inc.: *See*—
Owen, Raymond E., 4,926,698, Cl. 73-861.610.

Procter & Gamble Company: *See*—
McCall, Patrick C., 4,927,563, Cl. 252-551.000.

Proctor & Gamble Company, The: *See*—
Revis, Jack W.; Sagel, John A.; and Ostendorf, Daniel I., 4,927,557, Cl. 252-174.150.

Professional Packaging Limited: *See*—
Holmes, Gordon W., 4,926,572, Cl. 40-448.000.

Profrock, William P., Jr. Method for reducing sand production in submersible-pump wells. 4,926,942, Cl. 166-250.000.

Programmation, Inc.: *See*—
Weiss, Mitchell, 4,926,753, Cl. 104-88.000.

Progressive Angioplasty Systems, Inc.: *See*—
Hess, Robert, 4,927,413, Cl. 604-95.000.

Protopapas, Dimitrios, to Unisys Corporation. Time division multiplexer/demultiplexer with deterministic time slot assignment. 4,928,273, Cl. 370-85.700.

Provence, Marc; and Rousset, Didier, to Salomon, S.A. Cross-country ski binding. 4,927,168, Cl. 280-615.000.

Provenzo, Eugene F., Jr.; and Zorn, Peter A., to Patrician Corporation. Airfoil configuration. 4,927,100, Cl. 244-153.00R.

Prugnolle, Bernard: *See*—
Krasuski, Marek; and Prugnolle, Bernard, 4,926,612, Cl. 53-69.000.

PSI Star: *See*—
Nelson, Norvell J.; and Martens, Phillip A., 4,927,700, Cl. 428-209.000.

Public Health Laboratory Service Board: *See*—
Carr, Robert; Clarke, David J.; and Atkinson, Tony, 4,927,268, Cl. 356-336.000.

Puech, Claude: *See*—
Pocholle, Jean P.; Papuchon, Michel; Puech, Claude; and Tournois, Pierre, 4,927,223, Cl. 350-96.150.

Pulichino, John V., Jr., to American Tourister, Inc. Garment bag with flap cover for strap hook. 4,927,014, Cl. 206-287.100.

Pullman Company, The: *See*—
Kotz, Steven P.; and Lane, John H., 4,927,285, Cl. 403-133.000.
Schwarz, Albert J.; and Pietramale, Anthony M., 4,927,116, Cl. 251-312.000.

Purdue Research Foundation: *See*—
Pidgeon, Charles, 4,927,879, Cl. 525-54.100.

Pure-Pak, Inc.: *See*—
Lisiecki, Robert E., 4,927,075, Cl. 229-125.340.

Purrmann, Robert; Guggenberger, Rainer; and Pieper, Gunter, to ESPE Stiftung & Co. Produktions- und Vertriebs KG. Shapable material and shaped articles obtainable therefrom. 4,927,866, Cl. 523-115.000.

Putz, Heinrich; Nowitzki, Friedhelm; Damm, Gunter; Bathelt, Hartmut; Kromer, Gunter; Hoffmann, Henning; and Pischke, Reiner, to Audi AG. Method and apparatus for producing a homogeneous exhaust gas mixture in an exhaust system for an internal combustion engine having two banks of cylinders. 4,926,634, Cl. 60-274.000.

Qualcomm, Inc.: *See*—
Gilhousen, Klein S.; and Antonio, Franklin P., 4,928,274, Cl. 370-92.000.

Quarles, Carey L., to Coors Biotech, Inc. Method and composition for improved animal husbandry. 4,927,811, Cl. 514-23.000.

Quebec Metal Powders, Ltd.: *See*—
Ciloglu, Cavit; Gagne, Martin; Laraque, Edy; Poirier, Joel; Tremblay, Sylvain; and Trudel, Yves, 4,927,461, Cl. 75-254.000.

Quick Cuisine Limited: *See*—
Roberts, William W., 4,927,650, Cl. 426-295.000.

Quinn, Clayton B.: *See*—
Adams, Ronald L.; Kimbel, Kirk L.; and Quinn, Clayton B., 4,927,675, Cl. 428-35.900.

R. J. Reynolds Tobacco Company: *See*—
Bailey, Jennifer A., 4,927,647, Cl. 426-126.000.

Raab, Lothar: *See*—
Stolz, Robert; Mirring, Knut; Hein, Rudolf; Simon, Dieter; Raab, Lothar; and Glatz, Peter, 4,927,276, Cl. 384-572.000.

Raahauge, Jerald C., to Summer & Taylor, Inc. Universal plotter pen having improved marking fluid flow characteristics. 4,928,121, Cl. 346-140.00R.

Rabinovitz, Raphael S.; and Hartley, Craig J., to Baylor College of Medicine. Implantable and extractable biological sensor probe. 4,926,875, Cl. 128-691.000.

Rademacher, Thomas W.: *See*—
Feder, Joseph; Howard, Susan C.; Wittwer, Arthur J.; Rademacher, Thomas W.; Parekh, Raj B.; and Dwek, Raymond A., 4,927,630, Cl. 424-94.640.

Radermacher, Reinhard: *See*—
Dawn, Douglas D.; and Radermacher, Reinhard, 4,926,650, Cl. 62-114.000.

Radtchenko, Konstantin. Quick gliding lure. 4,926,577, Cl. 43-42.000.

Ragonese, Francis P.: *See*—
Child, Jonathan E.; Choi, Byung C.; and Ragonese, Francis P., 4,927,977, Cl. 568-695.000.

Rahikainen, Ahti. Method and apparatus for photographing a movement. 4,927,261, Cl. 352-39.000.

Rahman, Abdul W. B. A., to Hewlett-Packard Company. Cursor control mechanism. 4,928,093, Cl. 340-709.000.

Raj, Kuldip; Moses, Joseph; Moskowitz, Ronald; and Bloom, Frank, to Ferrofluidics Corporation. Ferrofluid seal with epoxy pole pieces. 4,927,164, Cl. 277-80.000.

Ralph Earl Co., Inc.: *See*—
Lothammer, Henry, 4,926,723, Cl. 82-118.000.

Ramalingam, Subbiah; and Frohrib, Darrell A., to University of Minnesota, Regents of the. Integral acoustic emission sensor for manufac-

turing processes and mechanical components. 4,927,299, Cl. 407-120.000.
Ramalingam, Subbiah; and Frohrib, Darrell A., to University of Minnesota, Regents of the. Intelligent insert with integral sensor. 4,927,300, Cl. 407-120.000.
Ramanathan, Visvanathan: *See*—
Duthaler, Rudolf; Finter, Jurgen; Fischer, Walter; and Ramanathan, Visvanathan, 4,927,865, Cl. 522-48.000.
Ramos, Gerardo: *See*—
Schneider, Peter; Ramos, Gerardo; and Bersier, Jacques, 4,927,507, Cl. 204-78.000.
Ramot Univ. Authority for Applied Res. & Devp. Ltd.: *See*—
Teitz, Yael, 4,927,843, Cl. 514-418.000.
Randall, Curtis J.: *See*—
Kimball, Christopher V.; Stanke, Fred E.; Randall, Curtis J.; and Hayman, Andrew J., 4,928,269, Cl. 367-35.000.
Randall, Osro W., III: *See*—
Stevens, Timothy S.; Langhorst, Martin A.; and Randall, Osro W., III, 4,927,539, Cl. 210-635.000.
Randy, Frank. Holder for socket wrench heads. 4,927,020, Cl. 206-378.000.
Rao, Balbir S.: *See*—
Holloway, Brian R.; Howe, Ralph; Rao, Balbir S.; and Stribling, Donald, 4,927,836, Cl. 514-620.000.
Rapoport, Norman R.: *See*—
Dampier, Michael S.; Prilik, Ronald J.; and Rapoport, Norman R., 4,928,061, Cl. 324-158.00F.
Raswant, Subhash. Road traffic network. 4,927,288, Cl. 404-1.000.
Rathmell, William G.: *See*—
Parry, Keith P.; Worthington, Paul A.; and Rathmell, William G., 4,927,839, Cl. 514-383.000.
Ratliff, Charles. Industrial dehumidifier. 4,926,618, Cl. 55-20.000.
Rattunde, Manfred, to Reimers Getriebe AG. Link chain for an infinitely variable cone drive disk transmission. 4,927,404, Cl. 474-242.000.
Rau, Robert J.; and Haydo, Donald H., to Italimpianti of America Incorporated. Automatic die box positioning for drawblock. 4,926,668, Cl. 72-289.000.
Raue, Roderich: *See*—
Harnisch, Horst; and Raue, Roderich, 4,927,729, Cl. 430-110.000.
Rauma-Repola Oy: *See*—
Riihimaki, Antti, 4,927,534, Cl. 209-315.000.
Ray, Michael: *See*—
Jack, Michael D.; Chapman, George R.; and Ray, Michael, 4,927,773, Cl. 437-22.000.
Ray, Wayne: *See*—
Roth, Scott S.; Nguyen, Bich-Yen; Tobin, Philip J.; Ray, Wayne; Wachholz, E. Petyr; and Wissen, Glenn, 4,927,780, Cl. 437-69.000.
Ray, Wilson B.: *See*—
Vicari, Richard; Aslam, Mohammad; Ray, Wilson B.; Davenport, Kenneth G.; Dammel, Ralph; Lingnau, Juergen; and Doessel, Karl-Friedrich, 4,927,956, Cl. 560-130.000.
Raychem Limited: *See*—
Diaz, Stephen H.; Cherian, Gabe; Morris, Stephen; Vinson, John R.; Crofts, David; and Moore, Anthony J., 4,928,199, Cl. 361-56.000.
Raytheon Company: *See*—
Kazior, Thomas E.; and Durschlag, Mark S., 4,927,784, Cl. 437-203.000.
MacMaster, George H.; and Nichols, Lawrence J., 4,928,070, Cl. 330-43.000.
Scott, John C., 4,928,072, Cl. 330-149.000.
Reading, Anthony H.; and Miles, Brynley J., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for United Kingdom Atomic Energy Authority in Her Britannic Majesty's Government of the. Immobilization of cells with alginate and agarose. 4,927,761, Cl. 435-178.000.
Reading, Christopher L.; Smyth, Malcolm R.; and O'Kennedy, Richard, to Board of Regents, The University of Texas. Methods and apparatus using galvanic immunoelectrodes. 4,927,502, Cl. 204-153.100.
Red Devil, Inc.: *See*—
Podlesny, Daniel B.; and Lopez, Ralph, 4,926,519, Cl. 15-235.400.
Red Eye Arms, Inc.: *See*—
Byron, David E., 4,926,739, Cl. 89-1.400.
Redfield, Steve R.: *See*—
Hesselink, Lambertus; and Redfield, Steve R., 4,927,220, Cl. 350-3.640.
Redicon Corporation: *See*—
Bulso, Joseph D., Jr.; and Lewers, William R., 4,926,724, Cl. 83-35.000.
Redl, Richard; and Sokal, Nathan O., to Cherry Semiconductor Corporation. Overcurrent protection for switching mode power converter. 4,928,200, Cl. 361-93.000.
Reed, Clive W.; Rzad, Stefan J.; and Devins, John C., to General Electric Company. Abrasion-resistant plastic articles and method for making them. 4,927,704, Cl. 428-221.000.
Reeder, James R.: *See*—
Crews, John H., Jr.; and Reeder, James R., 4,926,694, Cl. 73-794.000.
Rees, Theodore D., to Laserdrive Limited. Method and apparatus for encoding and decoding binary data. 4,928,187, Cl. 360-40.000.
Reese, Franklin S.: *See*—
Poehlein, Raymond E.; Reese, Franklin S.; and Adamek, John A., 4,928,141, Cl. 355-208.000.
Refsland, Earl R.: *See*—
Cambio, Orlando D., Jr.; and Refsland, Earl R., 4,926,856, Cl. 128-203.260.
Reginato, Louis L.: *See*—
Birx, Daniel L.; and Reginato, Louis L., 4,928,020, Cl. 307-106.000.
Rehm, Veronika: *See*—
Greulich, Norbert; Kiefer, Werner; and Rehm, Veronika, 4,927,442, Cl. 65-18.100.
Reich, Fritz: *See*—
Steinmetz, Hans-Werner; and Reich, Fritz, 4,927,183, Cl. 285-21.000.
Reichardt, Jurgen: *See*—
Kemmler-Sack, Sibylle; Morlotti, Romano; and Reichardt, Jurgen, 4,928,017, Cl. 250-483.100.
Reid, Derek J.: *See*—
Wilson, John R. H.; Pettman, Roger B.; and Reid, Derek J., 4,927,841, Cl. 514-400.000.
Reimers Getriebe AG: *See*—
Rattunde, Manfred, 4,927,404, Cl. 474-242.000.
Reiser, Steven M. Combined message display and brake light. 4,928,084, Cl. 340-479.000.
Reiterman, Lee, to GTE Valenite Corporation. Adjustable boring bar cartridge. 4,927,301, Cl. 408-180.000.
Reitz, Graydon A.: *See*—
Burba, Joseph C.; Landman, Ronald G.; Patil, Prabhakar B.; and Reitz, Graydon A., 4,928,227, Cl. 364-424.010.
Remacle, Jose . Support used in bioluminescent dosing of enzymes, substrates or enzymatic inhibitors. 4,927,752, Cl. 435-8.000.
Renga, James M.; Pon, Charles K.; Gulbenkian, Aylin H.; and Smith, Michael G., to Dow Chemical Company, The. Alkyl 2-fluoro-1-methoxyethylcarbamates. 4,927,508, Cl. 204-79.000.
Renishaw PLC: *See*—
McMurtry, D. R.; Stephens, W. F. N.; and Kirkbride, M., 4,926,566, Cl. 33-771.000.
Repman, Joseph F.; Morris, Thomas E.; and Hill, Thomas F., Jr., to Dow Chemical Company, The. Purification of anhydrous hydrogen chloride. 4,927,621, Cl. 423-488.000.
Repo, Erkki T.: *See*—
Henricson, Kaj O.; Repo, Erkki T.; and Ronkonharju, Hannu U., 4,927,529, Cl. 209-270.000.
Research Corporation of the University of Hawaii, The: *See*—
Holm-Kennedy, James W.; and McArthur, Scot P., 4,926,682, Cl. 73-54.000.
Holm-Kennedy, James W.; Kawamoto, Eric H.; and Bopp, Thomas T., 4,926,693, Cl. 73-597.000.
Research Foundation of State University of New York, The: *See*—
Kalman, Thomas I., 4,927,966, Cl. 562-594.000.
Resnik, Robert K.: *See*—
Mathur, Krishna K.; Resnik, Robert K.; and Simmons, Randall G., 4,927,618, Cl. 423-432.000.
Retroperfusion Systems, Inc.: *See*—
Menasche, Philippe, 4,927,412, Cl. 604-96.000.
Reum, Helmut: *See*—
Auwarter, Gerhard; Imhof, Ernst; Komaroff, Iwan; Reum, Helmut; Schmid, Gunther; and Kaczynski, Bernhard, 4,926,819, Cl. 123-297.000.
Revis, Jack W.; Sagel, John A.; and Ostendorf, Daniel I., to Proctor & Gamble Company, The. Process for forming flakes. 4,927,557, Cl. 252-174.150.
Reynolds, Howard, to Siemon Company, The. Printed circuit board connector. 4,927,380, Cl. 439-411.000.
Rheem Manufacturing Company: *See*—
Shellenberger, Timothy J.; and Harrigill, William T., 4,926,840, Cl. 126-110.00R.
Rheinmetall GmbH: *See*—
Knabel, Horst, 4,926,559, Cl. 33-832.000.
Rhone-Poulenc Chimie: *See*—
Laurent, Claude; Rostaing, Paul; and Lyobard, Rene, 4,926,673, Cl. 72-465.000.
Michaud, Philippe; and Camberlin, Yves, 4,927,899, Cl. 528-49.000.
Michaud, Philippe; and Camberlin, Yves, 4,927,900, Cl. 528-49.000.
Michel, Paul, 4,927,615, Cl. 423-305.000.
Perron, Robert; and Mutez, Sylvain, 4,927,957, Cl. 560-202.000.
Rhone-Poulenc Industries: *See*—
Leveque, Alain; and Triollier, Michel, 4,927,609, Cl. 423-21.500.
Richards, William D., to Ophthalmic Ventures Limited Partnership. Surgical suturing system and probe assembly. 4,927,428, Cl. 606-148.000.
Richardson, Nicholas J.: *See*—
McCarthy, Daniel M.; Circello, Joseph C.; Munguia, Gabriel R.; and Richardson, Nicholas J., 4,928,225, Cl. 364-200.000.
Richardson-Vicks Inc.: *See*—
Sorrentino, James V.; Kelleher, William J.; and Moye, Jeanne O., 4,927,634, Cl. 424-405.000.
Richerson, Ben M. Cyclonic separator for removing and recovering airborne particles. 4,927,437, Cl. 55-349.000.
Rickey, James C. Graphic/tactile musical keyboard and nomographic music notation. 4,926,734, Cl. 84-423.00R.
Ricoh Company, Ltd.: *See*—
Higashi, Yuichirou, 4,928,148, Cl. 355-290.000.
Isoda, Tetsuo; Watanabe, Yoichiro; Nakayama, Nobuhiro; and Aoki, Mitsuo, 4,927,728, Cl. 430-108.000.
Kaneuchi, Kunihiro; Yasuda, Seigou; Ariyoshi, Takashi; Nakatani, Tomofumi; and Aizawa, Hiroshi, 4,928,302, Cl. 379-88.000.
Saeki, Shiro, 4,928,151, Cl. 355-320.000.

Riddell, Inc.: *See*—
Wingo Jr, James C., 4,926,503, Cl. 2-267.000.

Riebel, Hans-Jochem: *See*—
Fest, Christa; Muller, Klaus-Helmut; Pfister, Theodor; Riebel, Hans-Jochem; Kysela, Ernst; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Robert H., 4,927,454, Cl. 71-93.000.

Riedl, Volker: *See*—
Muller, Karl H.; Riedl, Volker; and Arbesmeier, Bernhard, 4,926,539, Cl. 29-568.000.

Rieger, Benedikt, to Dynamit Nobel Aktiengesellschaft. Rifle with safety system. 4,926,574, Cl. 42-70.040.

Riess, Gerard: *See*—
Heim, Philippe; and Riess, Gerard, 4,927,867, Cl. 523-339.000.

Riffe, Delmar R.; Kotlarek, Peter A.; and Utter, Robert E., to American Standard Inc. Rotating scroll apparatus with axially biased scroll members. 4,927,339, Cl. 418-55.000.

Riihiluoma, Clayton; and Miller, Kurt R. Chess-like board game apparatus and method of playing the same. 4,927,157, Cl. 273-260.000.

Riihimaki, Antti, to Rauma-Repola Oy. Screen system. 4,927,534, Cl. 209-315.000.

Riley, John M.: *See*—
Hickok, William K.; Riley, John M.; and Kosarko, Gerald J., 4,928,196, Cl. 360-105.000.

Rimai, Donald S.; and Sreekumar, Chandra, to Eastman Kodak Company. Thermally assisted transfer of small electrostatographic toner particles. 4,927,727, Cl. 430-99.000.

Ring Can Corporation: *See*—
Ring, Robert G., 4,927,042, Cl. 220-23.830.

Ring, Robert G., to Ring Can Corporation. Dispensing bottle container assembly including separable composite packages. 4,927,042, Cl. 220-23.830.

Ringrose, Gordon: *See*—
Fattal, R. George; and Ringrose, Gordon, 4,927,486, Cl. 156-351.000.

Rioja, Roberto J.; and Denzer, Diana K., to Aluminum Company of America. Alloy toughening method. 4,927,469, Cl. 148-11.50A.

Ripp, Francis J.: *See*—
Eckler, Donald P.; Mankus, John R.; Ripp, Francis J.; and Saxenmeyer Jr., George J., 4,927,387, Cl. 439-499.000.

Ritchie, Gordon V.: *See*—
Wright, Murray J.; and Ritchie, Gordon V., 4,928,201, Cl. 361-215.000.

Ritsko, Joseph E.: *See*—
Kopatz, Nelson E.; Johnson, Walter A.; and Ritsko, Joseph E., 4,927,456, Cl. 75-346.000.

Ritter, Sammie F.: *See*—
Neeley, Walter P.; and Ritter, Sammie F., 4,928,262, Cl. 367-106.000.

RMF Steel Products Co.: *See*—
Costello, Anthony W.; Ogg, Graeme J.; and McGregor, John C., 4,926,614, Cl. 53-434.000.

Roach, William C.: *See*—
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.

Roark, David N.: *See*—
Blocker, Wesley C.; Roark, David N.; and Hornbaker, Edwin D., 4,927,896, Cl. 526-93.000.

Robern, Inc.: *See*—
Katz, Howard S., 4,927,215, Cl. 312-224.000.

Robert Bosch GmbH: *See*—
Auwarter, Gerhard; Imhof, Ernst; Komaroff, Iwan; Reum, Helmut; Schmid, Gunther; and Kaczynski, Bernhard, 4,926,819, Cl. 123-297.000.
Harms, Klaus; Schray, Hans-Dieter; Taubitz, Bernd; and Wirtz, Rainer, 4,928,042, Cl. 318-254.000.
Taubitz, Bernd; Zieher, Peter; Kramer, Claus; Engelsdorf, Kurt; and Schuelke, Armin, 4,926,983, Cl. 188-299.000.

Roberts, Charles P.: *See*—
Gossler, Hans K.; and Roberts, Charles P., 4,927,026, Cl. 206-600.000.

Roberts, William W., to Quick Cuisine Limited. Food preparation. 4,927,650, Cl. 426-295.000.

Robertshaw Controls Company: *See*—
Genbauffe, Francis S.; and Kimmel, Steven A., 4,927,996, Cl. 219-413.000.
Hardin, George T., 4,926,697, Cl. 73-861.480.

Robertson, Jeffrey C.: *See*—
Van Brunt, Nicholas; Robertson, Jeffrey C.; and Homa, Daniel, 4,927,013, Cl. 206-221.000.

Robinson, Bruce R. Carbonation apparatus with CO_2 injection into serving vessel. 4,927,569, Cl. 261-79.200.

Robinson, David H.: *See*—
Brown, Roger C.; Dixon, John; and Robinson, David H., 4,927,822, Cl. 514-236.200.

Robinson Fin Machines, Inc.: *See*—
Haushalter, Frederick W., 4,926,935, Cl. 165-185.000.

Robinson, Robert J.: *See*—
Prescott, Robert C.; and Robinson, Robert J., 4,926,896, Cl. 137-82.000.

Robson, Michael J.; Cleare, Peter J. V.; and Spinney, Mark A., to Imperial Chemical Industries PLC. Insecticidal compounds characterized by enhanced knockdown effect. 4,927,852, Cl. 514-531.000.

Rockwell-CIM: *See*—
Noel, Jean P., 4,926,986, Cl. 192-0.02R.

Rockwell International Corporation: *See*—
Culp, Gordon W., 4,928,030, Cl. 310-328.000.
Cumming, James C., 4,926,980, Cl. 188-79.550.
Franklin, Hugh L.; Whatley, Leslie H.; and Klees, George N., 4,928,059, Cl. 324-123.00R.
Veerhusen, Dan S.; and Pattison, David C., 4,926,628, Cl. 60-39.150.

Rodel, Inc.: *See*—
Budinger, William D.; and Jensen, Elmer W., 4,927,432, Cl. 51-298.000.

Rodin, Bruce W., to Mirrorlite, Inc. Lighting apparatus. 4,928,209, Cl. 362-217.000.

Rodriguez, Domingo; and Gomez, Cebers, to Intevep, S.A. Process for removing vanadium and sulphur during the coking of a hydrocarbon feed. 4,927,524, Cl. 208-131.000.

Roebuck, Maurice J., to British Petroleum Company p.l.c. Container for high pressure gases. 4,927,038, Cl. 220-3.000.

Roessler, Bernward, to Siemens Aktiengesellschaft. Echo canceller circuit. 4,928,308, Cl. 379-411.000.

Roethel, Henry G.: *See*—
Leigh, James P.; and Roethel, Henry G., 4,927,061, Cl. 222-212.000.

Rogan, Joseph J.: *See*—
D'Angelo, Philip J.; Hetherington, Richard; and Rogan, Joseph J., 4,927,796, Cl. 502-62.000.

Rogers, Alan H.: *See*—
Garth, Peter; Simpson, Stuart M.; Parkinson, John E.; and Rogers, Alan H., 4,927,741, Cl. 430-309.000.

Roginski, Edward T., to Medical Automation Specialties, Inc. Method and apparatus for automatic processing and analyzing of blood serum. 4,927,545, Cl. 210-745.000.

Rohlmann, Maximilian: *See*—
Ungruh, Josef; and Rohlmann, Maximilian, 4,926,619, Cl. 56-15.400.

Rohrer, Donald K.: *See*—
Leonard, Patrick F.; Svetkoff, Donald J.; Kelley, Robert W.; Rohrer, Donald K.; and Coleman, E. North, Jr., 4,928,313, Cl. 382-8.000.

Rokutanda, Shuji; Higemitsu, Yasuo; Tsuchida, Akiyoshi; and Yamakoshi, Yukihiro, to Dainippon Ink. and Chemicals, Inc. Silver halide photographic light-sensitive material and a process for forming a high contrast photographic image. 4,927,734, Cl. 430-264.000.

Roll-in-Sheet Inc.: *See*—
Oats, Edwin O., 4,926,513, Cl. 5-488.000.

Roncel, Mercedes: *See*—
de la Rosa, Francisco F.; Navarro, Jose A.; Roncel, Mercedes; and de la Rosa, Miguel A., 4,927,512, Cl. 204-157.500.

Ronkonharju, Hannu U.: *See*—
Henricson, Kaj O.; Repo, Erkki T.; and Ronkonharju, Hannu U., 4,927,529, Cl. 209-270.000.

Ronnick, Albert J. Golf club including sight level indicator. 4,927,151, Cl. 273-162.00B.

Rose Elektrotechnik GmbH & Co. KG: *See*—
Meislitzer, Karl-Heinz; and Sandmann, Heinz, 4,927,984, Cl. 174-92.000.

Rose, Thomas E.: *See*—
Platt, William J.; and Rose, Thomas E., 4,926,607, Cl. 52-484.000.

Rosemount Inc.: *See*—
Kleven, Lowell A.; and Corpron, Gary P., 4,926,695, Cl. 73-861.240.

Rosenberg, Eli I.: *See*—
Crawley, H. Bert; Rosenberg, Eli I.; Meyer, W. Thomas; Gorbics, Mark S.; Thomas, William D.; McKay, Roy L.; and Homer, John F., Jr., 4,928,246, Cl. 364-514.000.

Rosenquist, Niles R., to General Electric Company. Polycarbonate cross-linker resin and fire resistant compositions made therefrom. 4,927,914, Cl. 528-480.000.

Rosenthal, Robert D., to Futrex, Inc. Near-infrared apparatus and method for determining percent fat in a body. 4,928,014, Cl. 250-341.000.

Rosenwinkel, Donald A.: *See*—
Breslow, Jeffrey D.; Zaruba, John V.; and Rosenwinkel, Donald A., 4,927,156, Cl. 273-256.000.

Rosler, Horst: *See*—
Melzig, Manfred; Rosler, Horst; and Schobl, Medardus, 4,927,239, Cl. 350-165.000.

Roslund, Charles J.; and Cook, Bruce M., to Westinghouse Electric Corp. Adaptable current regulating system. 4,928,219, Cl. 363-54.000.

Ross, Philip N., Jr., to United States of America, Energy. Novel air electrode for metal-air battery with new carbon material and method of making same. 4,927,718, Cl. 429-44.000.

Ross, Robert R.: *See*—
Bensel, William H., III; Gladden, Robert H., Jr.; Malluck, John F.; Ross, Robert R.; and Williamson, Andrew H., Jr., 4,927,227, Cl. 350-96.200.

Rossi, Domenico: *See*—
Pietrobon, Giovanni; Rossi, Domenico; and Pappalardo, Salvatore, 4,928,049, Cl. 318-685.000.

Rossmann, Axel; and Huether, Werner, to MTU Motoren-Und Turbinen-Union Muenchen GmbH. Drive system including an engine and a turbo-charger. 4,927,336, Cl. 417-407.000.

Rostaing, Paul: *See*—
Laurent, Claude; Rostaing, Paul; and Lyobard, Rene, 4,926,673, Cl. 72-465.000.

Roth, Scott S.; Nguyen, Bich-Yen; Tobin, Philip J.; Ray, Wayne; Wachholz, E. Petyr; and Wissen, Glenn, to Motorola, Inc. Encapsu-

lation method for localized oxidation of silicon. 4,927,780, Cl. 437-69.000.
Rotter, Franz: *See—*
Durchschlag, Gerald; Lang, Alfred; Rotter, Franz; Fritz, Dieter; and Kopilovitsch, Heinz, 4,927,102, Cl. 246-469.000.
Rotzinger, Hans: *See—*
Wenger, Hartmut; Martin, Peter; Rotzinger, Hans; and Denz, Martin, 4,926,789, Cl. 118-668.000.
Rous, Friedemann: *See—*
Breitenbach, Otto; Hetz, Helmar; Rous, Friedemann; and Ottenreuther, Josef, 4,927,570, Cl. 264-1.400.
Rousset Uclaf: *See—*
Bouton, Marie-Madeleine; Jacques, Jean; and Pierdet, Andre , 4,927,975, Cl. 568-373.000.
Clemence, Francois; Frechet, Daniel; and Fortin, Michel, 4,927,832, Cl. 514-299.000.
Galliani, Giulio; Barzaghi, Fernando; Bonetti, Carla; and Toja, Emilio, 4,927,837, Cl. 514-331.000.
Vivat, Michel; and Buendia, Jean, 4,927,921, Cl. 540-110.000.
Rousset, Didier: *See—*
Provence, Marc; and Rousset, Didier, 4,927,168, Cl. 280-615.000.
Rovenszky, Franz: *See—*
Binder, Dieter; Rovenszky, Franz; and Ferber, Hubert P., 4,927,821, Cl. 514-226.500.
Rowe, John P. Packaging assembly for substances to be post-mixed. 4,927,012, Cl. 206-219.000.
Roy, Richard S.: *See—*
Abbott, Robert A.; Barbara, Bruce; and Roy, Richard S., 4,928,266, Cl. 365-189.010.
Roychoudhury, Rathindra N., to Nestec S.A. Oil and fat release method. 4,927,566, Cl. 260-412.000.
Roze, Philipp: *See—*
Steinleitner, Gunther; and Roze, Philipp, 4,927,475, Cl. 156-89.000.
RSL Industries, Inc.: *See—*
Glover, Richard S., 4,927,056, Cl. 222-1.000.
Rubin, Robert H.; and Strauss, H. William, to General Hospital Corporation, The. Method for the diagnosis and treatment of inflammation. 4,926,869, Cl. 128-654.000.
Ruddell, Alan J.: *See—*
Eglise, David; and Ruddell, Alan J., 4,928,000, Cl. 235-380.000.
Rudick, Arthur G., to Coca-Cola Company, The. Motorless continuous carbonator. 4,927,567, Cl. 261-35.000.
Rudolph, Hans: *See—*
Schreckenberg, Manfred; Dhein, Rolf; Rudolph, Hans; and Nouvertne Werner, 4,927,903, Cl. 528-176.000.
Rugg, James M.: *See—*
Lesk, Israel A.; Thomas, Ronald E.; Hawkins, George W.; and Rugg, James M., 4,928,162, Cl. 357-72.000.
Ruhrkohle AG: *See—*
Becker, Wolfgang, 4,927,501, Cl. 202-248.000.
Ruigrok, Jacobus J. M.: *See—*
Zieren, Victor; and Ruigrok, Jacobus J. M., 4,927,804, Cl. 505-1.000.
Rush, James B.: *See—*
Meadows, Roger D.; Rush, James B.; and Bryan, James S., 4,926,535, Cl. 29-890.144.
Rushforth, Kevin C.: *See—*
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.
Rushmere, John D., to Du Pont de Nemours, E. I., and Company. Retention and drainage aid for papermaking. 4,927,498, Cl. 162-168.300.
Ryback, George: *See—*
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., 4,927,759, Cl. 435-156.000.
Rzad, Stefan J.: *See—*
Reed, Clive W.; Rzad, Stefan J.; and Devins, John C., 4,927,704, Cl. 428-221.000.
S.T.S. SRL: *See—*
Montali, Gian Luigi, 4,927,319, Cl. 414-788.400.
Saarenko, Pauli: *See—*
Vocke, Henning L.; and Saarenko, Pauli, 4,926,843, Cl. 126-390.000.
Sack, Allen J. Self leveling tables. 4,926,760, Cl. 108-145.000.
Saeki, Shiro, to Ricoh Company, Ltd. Apparatus for automatically and circulatively feeding originals. 4,928,151, Cl. 355-320.000.
Sagel, John A.: *See—*
Revis, Jack W.; Sagel, John A.; and Ostendorf, Daniel L, 4,927,557, Cl. 252-174.150.
St. Martin, Edward J., to UOP. Production of crystalline pigments from monascus during fermentation. 4,927,760, Cl. 435-171.000.
Saita, Tomohisa: *See—*
Kishi, Noriyuki; Katoh, Atsushi; and Saita, Tomohisa, 4,926,823, Cl. 123-432.000.
Saito, Katsuyuki: *See—*
Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Hasegawa, Jun; Sasaki, Masahiko; Sasagawa, Katsuyoshi; and Yamashita, Shinji, 4,928,172, Cl. 358-98.000.
Saito, Kazuya: *See—*
Nakashima, Kazutaka; and Saito, Kazuya, 4,927,788, Cl. 439-887.000.
Saito, Kenichi; Wada, Kou; and Yoshizawa, Masahiro, to Nippon Telegraph and Telephone Corp. Observing a surface using a charged particle beam. 4,928,010, Cl. 250-310.000.
Saito, Shinji: *See—*
Chino, Naoyoshi; Sato, Tsunehiko; Saito, Shinji; and Ogawa, Hiroshi, 4,927,665, Cl. 427-131.000.
Sakaguchi, Hiroaki: *See—*
Aramaki, Minoru; Sakaguchi, Hiroaki; and Nakamura, Tamio, 4,927,962, Cl. 562-113.000.
Sakai, Hiroshi, to NEC Corporation. Electronic switching system connected to an external computer. 4,928,304, Cl. 379-94.000.
Sakai, Shiro: *See—*
Umeno, Masayoshi; Sakai, Shiro; and Yahagi, Shinichiro, 4,928,154, Cl. 357-16.000.
Sakai, Takeshi; Matsui, Susumu; Akiyoshi, Sumiko; and Obayashi, Akira, to Takara Shuzo Co., Ltd. Quantitative determination of L-fucose. 4,927,753, Cl. 435-26.000.
Sakai, Takeshi; Yokota, Hiroko; Yamamoto, Kazuki; Yokoyama, Sadaji; Matsui, Susumu; Kato, Ikunoshin; and Obayashi, Akira, to Takara Shuzo Co., Ltd. Method for the detection of diseases associated with the metabolic abnormality of L-fucose. 4,927,767, Cl. 436-64.000.
Sakaki, Takashi: *See—*
Yoshizawa, Tetsuo; Terayama, Yoshimi; Kondo, Hiroshi; Sakaki, Takashi; Haga, Shunichi; Ichida, Yasuteru; and Konishi, Masaki, 4,926,549, Cl. 29-876.000.
Sakakibara, Koichi; and Ozawa, Yasuo, to Koito Manufacturing Co., Ltd. Vehicle lamp lens having Fresnel lens. 4,927,248, Cl. 350-452.000.
Sakamoto, Kiyoaki; Matsubara, Kenichi; Nakahara, Yasuhiro; and Nomura, Masaki, to Tosoh Corporation. Axially adjustable-type column device. 4,927,531, Cl. 210-198.200.
Sakane, Kazuo: *See—*
Takaya, Takao; Sakane, Kazuo; Miyai, Kenzi; and Kawabata, Kohji, 4,927,818, Cl. 514-202.000.
Sakata, Shuichi: *See—*
Masuda, Masaaki; Kotani, Masanori; Wakahara, Katsuhiro; and Sakata, Shuichi, 4,926,653, Cl. 62-204.000.
Sakayori, Hiroyuki: *See—*
Yamazaki, Shunpei; Mase, Akira; and Sakayori, Hiroyuki, 4,927,493, Cl. 156-643.000.
Sakimori, Hideharu; Ihara, Susumu; and Hayashi, Hiroyuki, to Mazda Motor Corporation. Engine valve feed apparatus. 4,927,314, Cl. 414-416.000.
Sako, Mineyuki: *See—*
Okamoto, Hiroshi; Oka Tateki; Sako, Mineyuki; Kyogoku, Tetsuo; and Suzuki, Toshikazu, 4,928,145, Cl. 355-245.000.
Sakuma, Yuichi, to Nissan Motor Co., Ltd. Exhaust system for multi-cylinder engine. 4,926,635, Cl. 60-299.000.
Sakuyama, Hiroshi: *See—*
Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, 4,926,906, Cl. 137-625.300.
Sala, Siro: *See—*
Winkler, Robert; Sala, Siro; Kobayashi, Takayuki; and Yokota, Shinjiro, 4,927,494, Cl. 159-2.100.
Salce, Luigi C., Sr., to Advance Manufacturing Co., Inc. Torque tool. 4,926,699, Cl. 73-862.210.
Salcher, Olga: *See—*
Frobel, Klaus; Muller, Hartwig; Biachoff, Erwin; Salcher, Olga; de Jong, Anno; Berschauer, Friedrich; and Scheer, Martin, 4,927,810, Cl. 514-23.000.
Salmas, Philip, to Gates Rubber Company, The. Intersticed nipple for elastomeric hose. 4,926,909, Cl. 138-109.000.
Salomon, Mary F.: *See—*
Jolley, Scott T.; and Salomon, Mary F., 4,927,554, Cl. 252-68.000.
Salomon, S.A.: *See—*
Provence, Marc; and Rousset, Didier, 4,927,168, Cl. 280-615.000.
Salvagno, Elvio, to Bull HN Information Systems Italia S.p.A. Selective grounding device for electronic equipment. 4,927,367, Cl. 439-92.000.
Sampey, Ted J. Safety choke valve. 4,926,898, Cl. 137-315.000.
Sampson, Robert; and Flanigan, Sean, to Waco Products, Inc. Skylight construction. 4,926,594, Cl. 52-200.000.
Sanborn, Bruce A.: *See—*
Hallings, Leonard L.; Bramer, Donald W.; Sanborn, Bruce A.; and Schryver, James E., 4,928,211, Cl. 362-33.000.
Sandberg, John A.: *See—*
Dahlinder, Lars-Erik D.; Johansson, Mats O.; Sandberg, John A.; and Sjo, 4,927,640, Cl. 424-497.000.
Sanders, Beatrix Y.: *See—*
Fitzgerald, Walter P.; Sanders, Beatrix Y.; and Bagheri, Mansour A. H., 4,927,307, Cl. 411-302.000.
Sandmann, Heinz: *See—*
Meislitzer, Karl-Heinz; and Sandmann, Heinz, 4,927,984, Cl. 174-92.000.
Sandoz Ltd.: *See—*
Gisi, Ulrich, 4,927,823, Cl. 514-237.500.
Sandoz Pharm. Corp.: *See—*
Damon, Robert E., II; and Wareing, James R., 4,927,851, Cl. 514-460.000.
Sands, Philip W., to Shipley Company, Inc. Fitting for connecting a drum to a pipeline. 4,927,188, Cl. 285-89.000.
Sanemitsu, Yuzuru: *See—*
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; Inoue, Satoru; Sugano, Masayo; and Tanako, Hirotaka, 4,927,827, Cl. 514-256.000.
Sanford, David L.; and Douglass, Gary W., to United Technologies Corporation. Fitting with lock wire feature. 4,927,187, Cl. 285-80.000.

Sanford, Kirk. Retractable cigarette lighter holder. 4,927,354, Cl. 431-253.000.
Sankaranarayanan, Ashok: *See*—
Watson, Gary W.; Cheskis Harvey P.; and Sankaranarayanan, Ashok, 4,926,927, Cl. 164-429.000.
Sanken Electric Co., Ltd.: *See*—
Ushikubo, Takao; Iwasa, Yasuhiro; and Yamaji, Yukinori, 4,927,069, Cl. 228-123.000.
Sano, Joji. Manufacturing process of packed fast-cooking rice. 4,927,660, Cl. 426-618.000.
Sano, Yasuro: *See*—
Hanyu, Susumu; Hara, Kazumasa; and Sano, Yasuro, 4,926,770, Cl. 112-453.000.
Sanofi: *See*—
Boigegrain, Robert; Cecchi, Roberto; and Boveri, Sergio, 4,927,955, Cl. 560-45.000.
Sanshin Kogyo Kabushiki Kaisha: *See*—
Hayasaka, Kenichi, 4,927,393, Cl. 440-112.000.
Kudoh, Noboru; Hirukawa, Itsushi; Aoki, Satoshi; Yoshimura, Tsuyoshi; and Shiozawa, Shigeki, 4,927,390, Cl. 440-88.000.
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Jack, Michael D.; Chapman, George R.; and Ray, Michael, 4,927,773, Cl. 437-22.000.
Santel, Hans-Joachim: *See*—
Fest, Christa; Muller, Klaus-Helmut; Pfister, Theodor; Riebel, Hans-Jochem; Kysela, Ernst; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Robert H., 4,927,454, Cl. 71-93.000.
Sare, Edward J.: *See*—
Wiedrich, Charles R.; and Sare, Edward J., 4,927,546, Cl. 210-755.000.
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Kamath, Vasanth R.; and Sargent, James D., 4,927,891, Cl. 525-327.300.
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Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Hasegawa, Jun; Sasaki, Masahiko; Sasagawa, Katsuyoshi; and Yamashita, Shinji, 4,928,172, Cl. 358-98.000.
Sasaki, Hidemi: *See*—
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Sasaki, Isao: *See*—
Anzai, Hisao; Makino, Hideaki; Ootani, Masami; Sasaki, Isao; and Nishida, Kozi, 4,927,893, Cl. 525-378.000.
Sasaki, Masahiko: *See*—
Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Hasegawa, Jun; Sasaki, Masahiko; Sasagawa, Katsuyoshi; and Yamashita, Shinji, 4,928,172, Cl. 358-98.000.
Sasaki, Yasuo: *See*—
Kise, Masahiro; Yoshimoto, Yoshihiko; Fujisawa, Hiroshi; Sasaki, Yasuo; and Yasufuku, Shoji, 4,927,835, Cl. 514-448.000.
Satake, Mitsuo: *See*—
Teraoka, Kazuharu; Satake, Mitsuo; Denda, Toshio; Katayama, Takashi; and Seyasu, Shiro, 4,928,229, Cl. 364-464.010.
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Abbott, Kenneth E.; Lyons, Patrick J.; and Satariano, Richard M., 4,926,589, Cl. 51-427.000.
Sato, Kazo, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent and polymerizable compound. 4,927,730, Cl. 430-138.000.
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Kawata, Ken; Sato, Kozo; and Tsuboi, Masayoshi, 4,927,897, Cl. 526-240.000.
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Matsumoto, Takashi; Sato, Masamichi; Yoshida, Satoshi; and Kato, Yoshiaki, 4,928,186, Cl. 360-21.000.
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Sato, Seiichi, to Kato Hatsujo Kaisha, Ltd. Screw grommet. 4,927,306, Cl. 411-182.000.
Sato, Takeshi: *See*—
Yamamoto, Hideo; Sato, Takeshi; Yoshimi, Toshikazu; Mori, Shuichi; and Tokumo, Akio, 4,928,071, Cl. 330-129.000.
Sato, Tsunehiko: *See*—
Chino, Naoyoshi; Sato, Tsunehiko; Saito, Shinji; and Ogawa, Hiroshi, 4,927,665, Cl. 427-131.000.
Saturn Corporation: *See*—
Adams, Frederic R.; Boyer, Jeffrey M.; Schultz, Ronald N.; and Taylor, Barry, 4,926,959, Cl. 180-315.000.
Saulnier, Kenneth D.; and Van Leeuwen, Hubert J., to Saulnier, Kenneth D. Combined buoy and anchor device. 4,927,395, Cl. 441-26.000.
Savenije, Herman: *See*—
DeRudder, James L.; Savenije, Herman; and Wang, I-Chung W., 4,927,880, Cl. 525-63.000.
Savick, Wayne K.: *See*—
Fossum, Steven C.; Sedivy, J. Gregory; and Savick, Wayne K., 4,926,674, Cl. 73-4.00R.
Savord, Bernard J.: *See*—
Brock-Fisher, George A.; Kranz, Paul R.; Mniece, James R.; Thiele, Karl E.; Savord, Bernard J.; and Smith, Richard B., 4,926,872, Cl. 128-661.010.
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Saxenmeyer Jr., George J.: *See*—
Eckler, Donald F.; Mankus, John R.; Ripp, Francis J.; and Saxenmeyer Jr., George J., 4,927,387, Cl. 439-499.000.
Saxon, Ronald L.; Zeger, Leroy; and Horbatt, Kenneth, to Pharmacia ENI Diagnostics, Inc. Automatic reagent dispenser. 4,927,765, Cl. 436-43.000.
Scaduto, Onofrio. Suspension system with constant camber. 4,927,169, Cl. 280-661.000.
Scala, Christopher R. Sculpture process. 4,927,504, Cl. 204-23.000.
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Morrill, Vaughan, Jr.; Scandrett, John H.; and Hudson, David K., 4,926,543, Cl. 29-623.000.
Schaefer, John P. Golf putting practice device. 4,927,153, Cl. 273-187.00R.
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Schaffer, Timothy J., to Westinghouse Electric Corp. Wideband multichannel digital radio frequency memory. 4,928,104, Cl. 342-15.000.
Schauer, Friedrich; and Wolff, Manfred, to Kabelmetal Electro GmbH. Apparatus for providing an electrical conduction path between two contact locations which are rotatable with respect to each other. 4,927,365, Cl. 439-15.000.
Schechter, Elieser. Indexed reference book. 4,927,178, Cl. 283-38.000.
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Scheer, Martin: *See*—
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Durkop, Willi; and Scheffner, Wolfgang, 4,927,383, Cl. 439-491.000.
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Schiemer, Thomas, Jr.: *See*—
Morrissey, Mark E.; and Schiemer, Thomas, Jr., 4,927,159, Cl. 273-338.000.
Schilling, Peter, to Westvaco Corporation. Lignin-based cement fluid loss control additive. 4,926,944, Cl. 166-293.000.
Schimmel, Karl F.; and Blackburn, William P., to PPG Industries, Inc. High solids coating compositions containing a polyepoxide and a copolymer of an alpha-olefin and an olefinically unsaturated monoanhydride. 4,927,868, Cl. 523-439.000.
Schink, Helmut; and Schnell, Ralf D., to Siemens Aktiengesellschaft. Amplifying surface wave receiver. 4,928,069, Cl. 330-5.500.
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Anderson, Conroy D.; Chou, Tai-Sheng; Cormier, William E., Jr.; Dwyer, Francis G.; Krambeck, Frederick J.; Pasquale, Gary M.; Schipper, Paul H.; and Stover, William A., 4,927,526, Cl. 208-152.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,927,522, Cl. 208-120.000.
Schirmer, Robert M.; Fromm, Ellsworth H.; and Alquist, Henry E., to Phillips Petroleum Company. Method for burning nitrogen-containing fuels. 4,927,349, Cl. 431-10.000.
Schleuchardt, Manfred, to Francotyop-Postalia GmbH. Clutch for franking machine. 4,926,990, Cl. 192-28.000.
Schlipf, Michael, to Nokia Graetz. Glass viewing screen for a color-picture-reproducing device and a method of making the same. 4,928,035, Cl. 313-466.000.
Schlumberger Technology Corporation: *See*—
Jorion, Bruno; Galiano, Christian; and Wraight, Peter, 4,928,088, Cl. 340-854.000.
Kimball, Christopher V.; Stanke, Fred E.; Randall, Curtis J.; and Hayman, Andrew J., 4,928,269, Cl. 367-35.000.
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Schmidt, Daniel G.: *See*—
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Schmidt, Erno : *See*—
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Schmidt, Karl-Heinz; and Waidelich, Wilhelm, to Gesellschaft fur Strahlen. Electronic camera-processing circuit for automatically tracking particles which move across an optical image. 4,928,176, Cl. 358-126.000.
Schmidt, Robert R.: *See*—
Fest, Christa; Muller, Klaus-Helmut; Pfister, Theodor; Riebel, Hans-Jochem; Kysela, Ernst; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Robert H., 4,927,454, Cl. 71-93.000.

Schmitt, Rolf-Eberhard: *See*—
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Schneider, Ib: *See*—
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Schneider Medical Technologies, Inc.: *See*—
Moncada, Elizabeth; and Schneider, Michael B., 4,927,417, Cl. 604-198.000.
Schneider, Michael B.: *See*—
Moncada, Elizabeth; and Schneider, Michael B., 4,927,417, Cl. 604-198.000.
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Aaslyng, Dorrit A.; Jensen, Georg W.; Schneider, Ib; and Schneider, Palle, 4,927,558, Cl. 252-174.120.
Schneider, Peter; Ramos, Gerardo; and Bersier, Jacques, to Ciba-Geigy Corporation. Novel process for the manufacture of 4-acyloxy-3-hydroxyethyl-azetidinones. 4,927,507, Cl. 204-78.000.
Schneider, Rudolf, to Netall- u. Kunststoffwaren Erzeugengsgesellschaft M.B.H. Dental prosthesis implant. 4,927,363, Cl. 433-173.000.
Schnell, Ralf D.: *See*—
Schink, Helmut; and Schnell, Ralf D., 4,928,069, Cl. 330-5.500.
Schnettler, Richard A.: *See*—
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Schnoes, Heinrich K.: *See*—
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Schnoor, William J.: *See*—
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Schobl, Medardus: *See*—
Melzig, Manfred; Rosler, Horst; and Schobl, Medardus, 4,927,239, Cl. 350-165.000.
Schoen, Neil C. Single pass phase conjugate aberration correcting imaging telescope. 4,927,251, Cl. 350-503.000.
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., to Shell Oil Company. New strains of *Pseudomonas putida* and their use. 4,927,759, Cl. 435-156.000.
Schohl, Gerald A.; and Vigander, Svein, to Tennessee Valley Authority. Air detector for liquid-filled sensing lines. 4,926,675, Cl. 73-19.000.
Scholz, Dankmar: *See*—
Wallbillich, Guenter; Bleckmann, Gerhard; and Scholz, Dankmar, 4,927,740, Cl. 430-309.000.
Scholz, Edward. Adjustable louvered awning. 4,926,599, Cl. 49-88.000.
Schott Glaswerke: *See*—
Greulich, Norbert; Kiefer, Werner; and Rehm, Veronika, 4,927,442, Cl. 65-18.100.
Tauber, Gunter; and Dornauf, Andrea, 4,927,518, Cl. 204-421.000.
Schrader, Dieter; and Neuhaus, Winifried, to Henkel Kommanditgesellschaft auf Aktien. Emulsion-form hydrogen peroxide preparations for the bleaching and oxidative dyeing of hair. 4,927,627, Cl. 424-62.000.
Schramm, Heather R.: *See*—
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Schray, Hans-Dieter: *See*—
Harms, Klaus; Schray, Hans-Dieter; Taubitz, Bernd; and Wirtz, Rainer, 4,928,042, Cl. 318-254.000.
Schreckenberg, Manfred; Dhein, Rolf; Rudolph, Hans; and Nouvertne Werner, to Bayer Aktiengesellschaft. Diphenol monoesters of carboxylic acids and process for their preparation. 4,927,903, Cl. 528-176.000.
Schroder, Joris, to Inventio AG. Method and apparatus for the control of elevator cars from a main floor during up peak traffic. 4,926,976, Cl. 187-125.000.
Schryver, James E.: *See*—
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Schubert & Salzer Maschinenfabrik Aktiengesellschaft: *See*—
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Schultheiss, Eberhard; and Wirz, Peter, to Leybold Aktiengesellschaft. Method and arrangement for fabricating magneto-optical, storable, and/or deletable data carriers. 4,927,513, Cl. 204-192.130.
Schultz, Ronald N.: *See*—
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Schulz, Galyn A., to James River Corporation of Virginia. Method multi-ply embossed fibrous sheet. 4,927,588, Cl. 264-258.000.
Schumer, Leroy F. Ladder supports. 4,926,968, Cl. 182-172.000.
Schwartz, Alfred, to Hughes Aircraft Company. Multiple pupil projection display. 4,927,262, Cl. 353-13.000.
Schwartz, Paul A., to Eastman Kodak Company. Photographic stabilizing bath containing polyarcylic acid. 4,927,746, Cl. 430-372.000.
Schwarz, Albert J.; and Pietramale, Anthony M., to Pullman Company, The. Plug valve. 4,927,116, Cl. 251-312.000.
Schwarz, Joshua; and Accardi, Christine, to Lever Brothers Company. Low perborate to precursor ratio bleach systems. 4,927,559, Cl. 252-186.390.
Schweizer, Werner; McGuire, Daniel J.; and Archer, Edward D., to Curt G. Joa, Inc. Stack stripper for a stacking machine. 4,927,322, Cl. 414-794.700.
Schwengers, Dieter, to Pfeifer & Langen. Water soluble iron dextran and a process for its manufacture. 4,927,756, Cl. 435-103.000.
Schwerdt, Hans-Werner, to Carl Freudenberg, Firma. Elastic sleeve spring with reinforcement bodies for increased stiffness. 4,927,123, Cl. 267-140.100.
SCI Systems, Inc.: *See*—
Fulton, Alfred L., 4,928,133, Cl. 346-150.000.
Scimone, Anthony: *See*—
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Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, 4,927,659, Cl. 426-611.000.
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Scoates, William D.; and Scoates, Samuel W., 4,927,328, Cl. 415-220.000.
Scoates, William D.; and Scoates, Samuel W. Shroud assembly for axial flow fans. 4,927,328, Cl. 415-220.000.
Scott, John C., to Raytheon Company. Amplifier having suppressed spurious frequency components. 4,928,072, Cl. 330-149.000.
Scozzafava, Michael; Tang, Ching W.; and Young, Ralph H., to Eastman Kodak Company. Photoreceptor with polynuclear bisoxazole or bisthizole. 4,927,726, Cl. 430-78.000.
Scully, Marian O., to Agri Research and Development. Sustained release medicating device for livestock. 4,927,419, Cl. 604-892.100.
Seagate Technology, Inc.: *See*—
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Stapley, Gerald; Tate, Geoffrey; and Hardisty, Derek, 4,926,665, Cl. 70-277.000.
Sedivy, J. Gregory: *See*—
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Segelken, John M.: *See*—
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Seguin, Marie-Christine: *See*—
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Seiford, Donald S., Sr., to DS Industrial & Marine Co., Inc. Rail car moving system. 4,926,755, Cl. 104-183.000.
Seiko Epson Corporation: *See*—
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Seiko Instruments Inc.: *See*—
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Seita, Yukio; and Emi, Makoto, to Terumo Kabushiki Kaisha (Terumo Corporation). Method for the manufacture of flat permeable membrane. 4,927,576, Cl. 264-49.000.
Sekiguchi, Jinichi, to Meikho Industry Corp., Ltd. Ornamental button. 4,926,527, Cl. 24-90.00A.
Sekiguchi, Sunao, to NEC Corporation. Scalar data arithmetic control system for vector arithmetic processor. 4,928,238, Cl. 364-200.000.
Sekine, Masato: *See*—
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Sellke, Richard G.: *See*—
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Sells, Charles C.; and Martin, Robert N., to Sportsman's Market, Inc. Charcoal grilling unit. 4,926,838, Cl. 126-25.00A.
Semiconductor Energy Laboratory Co., Ltd.: *See*—
Hirose, Naoki; Inujima, Takashi; and Takayama, Toru, 4,926,791, Cl. 118-723.000.
Yamazaki, Shunpei; Mase, Akira; and Sakayori, Hiroyuki, 4,927,493, Cl. 156-643.000.
Sempell Armaturen GmbH: *See*—
Windelbandt, Herbert, 4,926,534, Cl. 29-888.451.
Senckowski, Joseph M.: *See*—
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Senshu, Hisashi; and Otsuka, Masahiro, to Orient Chemical Industries, Ltd. Purification of C.I. solvent black 3. 4,927,538, Cl. 210-634.000.
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Haritonidis, Joseph H.; Senturia, Stephen D.; Warkentin, David J.; and Mehregany, Mehran, 4,926,696, Cl. 73-205.000.
Serpentix Conveyor Corporation: *See*—
Dolan, Michael S., 4,927,006, Cl. 198-822.000.

Sevrain, Christophe Jean-Paul; Schramm, Heather R.; Schmidt, Daniel G.; Hooper, Paul S.; and Thomas, Mary P., to Sevrain-Tech, Inc. Electro-tactile stimulator. 4,926,879, Cl. 128-798.000.

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Sevrain, Christophe Jean-Paul; Schramm, Heather R.; Schmidt, Daniel G.; Hooper, Paul S.; and Thomas, Mary P., 4,926,879, Cl. 128-798.000.

Seyasu, Shiro: *See*—
Teraoka, Kazuharu; Satake, Mitsuo; Denda, Toshio; Katayama, Takashi; and Seyasu, Shiro, 4,928,229, Cl. 364-464.010.

SGS-Thomson Microelectronics S.p.A.: *See*—
Spatrisano, Antonio P.; Gandolfi, Luciano; Minotti, Carlo; and Di Cristina, Natale, 4,926,547, Cl. 29-841.000.

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Nguyen, Chinh, 4,928,261, Cl. 365-104.000.
Pietrobon, Giovanni; Rossi, Domenico; and Pappalardo, Salvatore, 4,928,049, Cl. 318-685.000.

Shaffer, John W., to GTE Products Corporation. Incandescent lamps including a combined getter. 4,927,398, Cl. 445-9.000.

Shang, Jean Y. Electrical push-pull connector. 4,927,381, Cl. 439-438.000.

Shannon, John K., Sr. Adjustable crimping tool. 4,926,685, Cl. 72-410.000.

Shapiro, Raymond E.: *See*—
Doyle, Peter L.; Ellenberger, John P.; Jones, Ellis O.; Carver, David C.; DiPirro, Steven D.; Gerovac, Branko J.; Armstrong, William P.; Gibson, Ellen S.; Shapiro, Raymond E.; Rushforth, Kevin C.; and Roach, William C., 4,928,247, Cl. 364-518.000.

Sharma, Ravinder K.; Geyer, Harry J.; and Mitchell, Douglas G., to Motorola Inc. Metallization scheme providing adhesion and barrier properties. 4,927,505, Cl. 204-34.500.

Sharp Kabushiki Kaisha: *See*—
Honda, Iwakazu, 4,928,129, Cl. 346-160.000.
Masuda, Masaaki; Kotani, Masanori; Wakahara, Katsuhiro; and Sakata, Shuichi, 4,926,653, Cl. 62-204.000.
Nakatsu, Hiroshi, 4,927,371, Cl. 439-79.000.
Okamoto, Yuji, 4,928,143, Cl. 355-218.000.
Shino, Katsuhide, 4,927,368, Cl. 439-66.000.
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Tanaka, Hironori; Kotani, Matahira; and Matsumoto, Masafumi, 4,927,130, Cl. 271-10.000.
Tanaka, Toshiyuki; Kuga, Shigeki; Nakamura, Nobuo; Morishita, Taro; and Wada, Masahiro, 4,928,236, Cl. 364-513.000.

Sharpe, Hillary M. Method of preventing cellulosic web degradation using an amine vapor. 4,927,497, Cl. 162-160.000.

Shaw, Henry, to Picanol N.V. Detection and standby weft supply apparatus break. 4,926,911, Cl. 139-435.100.

Shaw, Paul V.: *See*—
Buechele, James L.; Nielsen, Edward L.; Dong, Walter; and Shaw, Paul V., 4,927,978, Cl. 568-724.000.
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Wilson, John R. H.; and Pettman, Roger B., 4,927,840, Cl. 514-397.000.
Wilson, John R. H.; Pettman, Roger B.; and Reid, Derek J., 4,927,841, Cl. 514-400.000.

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Corley, Larry S., 4,927,907, Cl. 528-322.000.
Dong, Walter; Shaw, Paul V.; and Buechele, James L., 4,927,973, Cl. 568-724.000.
Drent, Eit; and Broekhuis, Antonius A., 4,927,892, Cl. 525-340.000.
Glandt, Carlos A.; Vinegar, Harold J.; and Prats, Michael, 4,926,941, Cl. 166-248.000.
Schofield, John A.; Betteridge, Peter R.; Ryback, George; and Geary, Philip J., 4,927,759, Cl. 435-156.000.
Wang, Pen C., 4,927,906, Cl. 528-228.000.
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Sherman, John B.: *See*—
Emerson, Richard C.; and Sherman, John B., 4,927,099, Cl. 244-152.000.

Sherwood Medical Company: *See*—
Lott, Gloria Y.; Britton, Scott M.; and Constantine, Barry E., 4,926,850, Cl. 128-155.000.

Shevtsov, Vitaly T.: *See*—
Komarov, Alexandr N.; Shevtsov, Vitaly T.; Zema, Viktor E.; Lebedik, Grigory L.; Zema, Evgeny M.; Nedorezov, Vladimir A.; Oblovatsky, Anatoly K.; Drozdov, Boris Y.; Zezjulinsky, Andrei A.; Kovalenko, Sergei V.; Litvin, Alexandr N.; Yatsenko, Vladislav P.; and Katunin, Alexandr N., 4,927,121, Cl. 267-47.000.

Shiba, Takahumi, to Pioneer Electronic Corporation. Spindle motor stop control device. 4,928,044, Cl. 318-364.000.

Shibagaki, Taro: *See*—
Ibe, Hiroyuki; Shibagaki, Taro; and Shimizu, Fumihiko, 4,928,318, Cl. 455-608.000.

Shibamoto, Yuta: *See*—
Kagiya, Tsutomu; Abe, Mitsuyuki; Nishimoto, Seiichi; Shibamoto, Yuta; Shimokawa, Kazuhiro; Hisanaga, Yorisato; Nakada, Tatsuo; and Yoshizawa, Toru, 4,927,941, Cl. 548-264.800.

Shibata, Katsuhiro; Azuma, Yuichi; Inoue, Masao; and Okumura, Shinichiro, to Honda Giken Kogyo Kabushiki Kaisha. Friction pad for use with disc brake. 4,926,978, Cl. 188-73.100.

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Shiga, Toshikazu; and Suzaki, Takuji, to Omron Tateisi Electronics Co. Non-invasive measuring method and apparatus of blood constituents. 4,927,264, Cl. 356-41.000.

Shigeki, Terumitsu: *See*—
Nishikawa, Masayuki; Miyazaki, Takeshi; Shigeki, Terumitsu; Mitzutani, Satoshi; and Isono, Toru, 4,927,190, Cl. 285-175.000.

Shigemura, Takuro: *See*—
Kita, Tatsuya; Shigemura, Takuro; Nakamura, Setsuo; and Nakane, Hisanori, 4,926,816, Cl. 123-203.000.

Shigemura, Tatsuya: *See*—
Kaku, Nobuyuki; Shigemura, Tatsuya; Uesugi, Masaki; Kano, Kiyoshi; and Ogiro, Kenji, 4,928,191, Cl. 360-85.000.

Shigeto, Kashiwabara: *See*—
Kazuo, Inoue; Noriyuki, Kishi; Masao, Kubodera; Eitetsu, Akiyama; Shigeto, Kashiwabara; and Osamu, Takizawa, 4,926,640, Cl. 60-602.000.

Shih, Chuan: *See*—
Taylor, Edward C.; Beardsley, George P.; Shih, Chuan; and Fletcher, Stephen R., 4,927,828, Cl. 514-258.000.

Shih, Jenn S.; Smith, Terry E.; and Login, Robert B., to GAF Chemicals Corporation. Aqueous process for preparing water-resistant coatings of hydrophobic copolymers made from hydrophilic monomers. 4,927,667, Cl. 427-154.000.

Shiley Incorporated: *See*—
Kamiya, Tadao; and Leader, Matthew J., 4,927,222, Cl. 350-96.150.

Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, to Snow Brand Milk Products Co., Ltd. Alprenolol derivatives. 4,927,959, Cl. 560-193.000.

Shimamune, Takayuki: *See*—
Nishiki, Yoshinori; Nakamatsu, Shuji; and Shimamune, Takayuki, 4,927,800, Cl. 502-349.000.

Shimazaki, Fumio, to Topia Industry Co., Ltd. Curtain drawing device. 4,926,922, Cl. 160-331.000.

Shimazaki, Osamu: *See*—
Tatsumi, Setsuji; Shiota, Kazuo; Urabe, Hitoshi; and Shimazaki, Osamu, 4,928,167, Cl. 358-80.000.

Shimizu, Fumihiko: *See*—
Ibe, Hiroyuki; Shibagaki, Taro; and Shimizu, Fumihiko, 4,928,318, Cl. 455-608.000.

Shimizu, Keiko: *See*—
Konishi, Masataka; Shimizu, Keiko; Ohbayashi, Masaru; Tomita, Koji; Miyaki, Takeo; and Oki, Toshikazu, 4,927,848, Cl. 514-453.000.

Shimkus, John W.; and Brownell, Jane M. Adjustable elastic bandage. 4,926,848, Cl. 128-169.000.

Shimokawa, Kazuhiro: *See*—
Kagiya, Tsutomu; Abe, Mitsuyuki; Nishimoto, Seiichi; Shibamoto, Yuta; Shimokawa, Kazuhiro; Hisanaga, Yorisato; Nakada, Tatsuo; and Yoshizawa, Toru, 4,927,941, Cl. 548-264.800.

Shimomura, Takeshi: *See*—
Yamaguchi, Shuichiro; Uchida, Naoto; Shimomura, Takeshi; and Oyama, Noboru, 4,927,516, Cl. 204-403.000.

Shimotsuhama, Isao; Emori, Shinji; Watanabe, Yoshio; and Tamamura, Masaya, to Fujitsu Limited. Referenceless ECL logic circuit. 4,928,024, Cl. 307-455.000.

Shimura, Kazuo, to Fuji Photo Film Co., Ltd. Radiation image read-out apparatus. 4,928,011, Cl. 250-327.200.

Shin-Etsu Chemical Co., Ltd.: *See*—
Takahashi, Masaharu; and Yoshida, Takeo, 4,927,587, Cl. 264-211.000.

Shin-Etsu Handotai Co., Ltd.: *See*—
Arima, Noburu; Ogino, Nobuyosi; and Kimura, Hirosi, 4,926,793, Cl. 118-730.000.

Shinbo, Haruo: *See*—
Naito, Kenzo; Ishibashi, Yukio; and Shinbo, Haruo, 4,927,964, Cl. 562-560.000.

Shino, Katsuhide, to Sharp Kabushiki Kaisha. Connector. 4,927,368, Cl. 439-66.000.

Shinoda, Masaru: *See*—
Miyajima, Nobukazu; Tanaka, Akira; and Shinoda, Masaru, 4,926,862, Cl. 428-419.00D.

Shinozaki, Kenichi: *See*—
Otsuka, Tetsuji; Shinozaki, Kenichi; Toyoyama, Kenji; and Ishihara, Shinobu, 4,927,356, Cl. 431-351.000.

Shintani, Yooichi: *See*—
Kamada, Eiki; Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; and Inoue, Kiyoshi, 4,928,226, Cl. 364-200.000.

Shionogi & Co., Ltd.: *See*—
Matsutani, Shigeru; and Mizushima, Yukio, 4,927,829, Cl. 514-258.000.

Shiota, Kazuo: *See*—
Tatsumi, Setsuji; Shiota, Kazuo; Urabe, Hitoshi; and Shimazaki, Osamu, 4,928,167, Cl. 358-80.000.

Shioya, Yoshiaki: *See*—
Imoto, Koji; Omura, Tadao; Kataoka, Yoichi; Nakajima, Kunihiko; Maekawa, Motoyuki; Tamura, Hiroki; and Shioya, Yoshiaki, 4,926,817, Cl. 123-292.000.
Shiozawa, Kouji: *See*—
Takatsuna, Kazutoshi; Shiozawa, Kouji; and Okumura, Yoshiharu, 4,927,953, Cl. 556-413.000.
Shiozawa, Shigeki: *See*—
Kudoh, Noboru; Hirukawa, Itsushi; Aoki, Satoshi; Yoshimura, Tsuyoshi; and Shiozawa, Shigeki, 4,927,390, Cl. 440-88.000.
Shipley Company, Inc.: *See*—
Sands, Philip W., 4,927,188, Cl. 285-89.000.
Shippey, Michael A.: *See*—
Erdman, Timothy R.; Shippey, Michael A.; and Wollenberg, Robert H., 4,927,551, Cl. 252-42.700.
Shiraki, Toshihiko: *See*—
Kusumoto, Hirotaka; and Shiraki, Toshihiko, 4,926,993, Cl. 192-98.000.
Shiraki, Toshinori; Hayano, Fusakazu; and Morita, Hideo, to Asahi Kasei Kogyo Kabushiki Kaisha. Modified block copolymer and a process for producing the same. 4,927,889, Cl. 525-285.000.
Shirley, Thomas F., Jr.; and Goldsmith, Eric S., to Motorola, Inc. Radio programming device with access to a remote database. 4,927,789, Cl. 455-67.000.
Shiroshita, Masao: *See*—
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; Inoue, Satoru; Sugano, Masayo; and Tanako, Hirotaka, 4,927,827, Cl. 514-256.000.
Shoji, Norio: *See*—
Sato, Mitsuru; Iizuka, Tetsuya; Furuya, Kiyoshi; Shoji, Norio; and Sekine, Masato, 4,928,074, Cl. 330-254.000.
Shonai, Tohru: *See*—
Kamada, Eiki; Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; and Inoue, Kiyoshi, 4,928,226, Cl. 364-200.000.
Shopsmith, Inc.: *See*—
Legler, John G.; Folkerth, Harold E.; and Flora, David D., 4,926,916, Cl. 144-136.00R.
Shou-Fu, Zhong: *See*—
Ma, Bao P.; Shou-Fu, Zhong; and Li, Qin Z., 4,926,742, Cl. 89-33.020.
Shrontz, Darrell G.: *See*—
Markiewicz, James E.; and Shrontz, Darrell G., 4,926,667, Cl. 72-256.000.
Shroot, Braham; Eustache, Jacques; and Bernardon, Jean-Michel, to Centre International de Recherches Dermatologiques C.I.R.D. Aromatic benzamido compounds, their preparation and their use in human or veterinary medicine or in cosmetic preparations. 4,927,928, Cl. 544-154.000.
Shutske, Gregory M.; and Kapples, Kevin J., to Hoechst Roussel Pharmaceuticals Inc. Fused heterocyclic derivatives of 1,2,3,4-tetrahydroacridine. 4,927,820, Cl. 514-229.500.
Shvartsman, Feliz P.: *See*—
Krongauz, Valeri A.; and Shvartsman, Felix P., 4,927,917, Cl. 534-567.000.
Sicard, Thierry M. A.; and Suquet, Michel J., to Siemens Aktiengesellschaft. Control circuit for an inductive load. 4,928,053, Cl. 323-284.000.
Siddiq, Mohammed, to Tandy Corporation. Multifunctional magnetic head cleaning media. 4,928,189, Cl. 360-128.000.
Siemens Aktiengesellschaft: *See*—
Dannhaeuser, Friedrich, 4,928,098, Cl. 340-825.560.
Huber, Anton, 4,927,382, Cl. 439-490.000.
Roessler, Bernward, 4,928,308, Cl. 379-411.000.
Schink, Helmut; and Schnell, Ralf D., 4,928,069, Cl. 330-5.500.
Sicard, Thierry M. A.; and Suquet, Michel J., 4,928,053, Cl. 323-284.000.
Wessels, Gerd, 4,926,857, Cl. 128-24.00A.
Wittchow, Eberhard, 4,926,799, Cl. 122-235.00A.
Siemens Energy & Automation, Inc.: *See*—
DiMarco, Bernard; and Kaufman, Steven A., 4,927,308, Cl. 411-437.000.
Wight, Donald C.; and Krueger, Keith T., 4,927,982, Cl. 174-50.000.
Siemens Transmission Systems, Inc.: *See*—
Lind, Paul U., 4,928,067, Cl. 324-96.000.
Siemon Company, The: *See*—
Reynolds, Howard, 4,927,380, Cl. 439-411.000.
Siems, Wolfgang: *See*—
Lorenzen, Heinz-Christen; Heitmann, Uwe; Siems, Wolfgang; and Pinck, Peter, 4,926,886, Cl. 131-84.400.
Sievert, Chester E., Jr.: *See*—
Stice, James D.; Sievert, Chester E., Jr.; and Christian, Steven C., 4,926,860, Cl. 606-144.000.
Signet Armorlite, Inc.: *See*—
Vaughan, Thomas L., 4,927,480, Cl. 156-228.000.
Silver, Scott C.: *See*—
Arbige, Michael V.; and Silver, Scott C., 4,927,644, Cl. 426-35.000.
Simcock, John H., to Inductotherm Europe Limited. Induction melting and stirring. 4,927,460, Cl. 75-10.140.
Simmons, Randall G.: *See*—
Mathur, Krishna K.; Resnik, Robert K.; and Simmons, Randall G., 4,927,618, Cl. 423-432.000.
Simmons, Ray A. Locking cylinder heating. 4,927,993, Cl. 219-201.000.
Simon, Arno: *See*—
Keens, Axel; and Simon, Arno, 4,927,269, Cl. 356-346.000.
Simon, Dieter: *See*—
Stolz, Robert; Mirring, Knut; Hein, Rudolf; Simon, Dieter; Raab, Lothar; and Glatz, Peter, 4,927,276, Cl. 384-572.000.
Simon, Mark A.: *See*—
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,926,632, Cl. 60-203.100.
Simons, Robert E.: *See*—
Chrysler, Gregory; Chu, Richard C.; and Simons, Robert E., 4,928,207, Cl. 361-385.000.
Simpson, James L., to Hemox, Inc. Medical appliance disposal container. 4,927,076, Cl. 229-132.000.
Simpson, Jeanette: *See*—
Dorn, Allan R., 4,927,749, Cl. 435-2.000.
Dorn, Allan R., 4,927,750, Cl. 435-2.000.
Simpson, John B.: *See*—
Gifford, Hanson S., III; Simpson, John B.; and Brown, Peter S., 4,926,858, Cl. 606-159.000.
Simpson, Stuart M.: *See*—
Garth, Peter; Simpson, Stuart M.; Parkinson, John E.; and Rogers, Alan H., 4,927,741, Cl. 430-309.000.
Simpson, William, to Clem Environmental Corporation. Leak prevention structure, method and apparatus. 4,927,297, Cl. 405-270.000.
Sims, Dewey M., Jr.; and Mick, Ray E., to Colt Industries Inc. Wiper for variable electrical resistor. 4,928,083, Cl. 338-202.000.
Sin-Etsu Quartz Products Co., Ltd.: *See*—
Arima, Noburu; Ogino, Nobuyosi; and Kimura, Hirosi, 4,926,793, Cl. 118-730.000.
Sirefelt, Lars. Actuator. 4,927,005, Cl. 198-781.000.
Sit, Sing-Yuen; and Wright, John J., to Bristol-Myers Company. Antihypercholesterolemic nitrile compounds. 4,927,944, Cl. 549-292.000.
Sjo: *See*—
Dahlinder, Lars-Erik D.; Johansson, Mats O.; Sandberg, John A.; and Sjo, 4,927,640, Cl. 424-497.000.
SKC Limited: *See*—
Park, Won B.; and Oh, Ju Y., 4,928,197, Cl. 360-132.000.
SKF GmbH: *See*—
Stolz, Robert; Mirring, Knut; Hein, Rudolf; Simon, Dieter; Raab, Lothar; and Glatz, Peter, 4,927,276, Cl. 384-572.000.
Skoch, Michael J.; and Hetzel, Frederick, to General Electric Company. Means for converting a lamp with a screw-type base into a lamp with a bi-pin base. 4,928,032, Cl. 313-318.000.
Small Products Limited: *See*—
Small, Richard F.; Patel, Dakshesh S.; Barrow, Lascelle A.; and Dix, Barry M., 4,927,663, Cl. 427-40.000.
Small, Richard F.; Patel, Dakshesh S.; Barrow, Lascelle A.; and Dix, Barry M., to Small Products Limited. Method for minimizing curling in screen printing. 4,927,663, Cl. 427-40.000.
Smedley, William H.: *See*—
Haber, Terry M.; Smedley, William H.; Foster, Clark B.; and Lewis, John A., Jr., 4,927,019, Cl. 206-365.000.
Smigel, Robert L.: *See*—
Gelinas, William A.; Holtz, Edwin R.; Argazzi, Dennis J.; Smigel, Robert L.; and Wiley, Dan W., 4,927,487, Cl. 156-351.000.
Smith, Bradford L., to Wovenwire Corporation. Woven wire apparatus. 4,927,674, Cl. 428-11.000.
Smith, Bruce A.: *See*—
Agoglia, Robert J.; Dayan, Richard A.; and Smith, Bruce A., 4,928,193, Cl. 360-78.040.
Smith, Clyde M. Work chamber with shifting ventilation zone. 4,926,746, Cl. 98-115.200.
Smith, Dave W. Mobile wheelchair lift and brakes therefore. 4,926,973, Cl. 187-11.000.
Smith, David H., to Binks Manufacturing Company. Plural component air spray gun and method. 4,927,079, Cl. 239-11.000.
Smith, Dennis C.; and Maijer, Rolf. Orthodontic attachments. 4,927,361, Cl. 433-9.000.
Smith, Donald R.: *See*—
Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.
Smith, Gary, to Mobile Music, Inc.; Smith, Gary; and Stefano, Joseph. Heated rotatable musical instrument stand. 4,926,735, Cl. 84-453.000.
Smith, Harold F.: *See*—
Dhanakoti, Padmanabhan; Moore, Gerry W.; and Smith, Harold F., 4,927,692, Cl. 428-137.000.
Smith, Hugh L.: *See*—
Enterline, David L.; and Smith, Hugh L., 4,927,257, Cl. 350-631.000.
Smith, James E.: *See*—
Whitlow, Graham A.; Bruck, Gerald J.; and Smith, James E., 4,927,992, Cl. 219-121.650.
Smith, James I.: *See*—
Jacobs, Linda Y.; Palmieri, Joseph M.; and Smith, James I., 4,928,080, Cl. 335-202.000.
Smith, June; and Smith, Steve. Framework for supporting and tying stacked waste paper and newspaper. 4,926,748, Cl. 100-34.000.
Smith, Keith E. Sweeper. 4,926,517, Cl. 15-82.000.
Smith, Mark L., to Boeing Company, The. Battery-operated data collection apparatus having an infrared touch screen data entry device. 4,928,094, Cl. 340-712.000.
Smith, Michael G.: *See*—
Renga, James M.; Pon, Charles K.; Gulbenkian, Aylin H.; and Smith, Michael G., 4,927,508, Cl. 204-79.000.

Smith, Michael P.: *See*—
Blackburn, Martin J.; and Smith, Michael P., 4,927,458, Cl. 75-246.000.

Smith, Richard B.: *See*—
Brock-Fisher, George A.; Kranz, Paul R.; Mniece, James R.; Thiele, Karl E.; Savord, Bernard J.; and Smith, Richard B., 4,926,872, Cl. 128-661.010.

Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., to Olin Corporation. Performance arcjet thruster. 4,926,632, Cl. 60-203.100.

Smith, Robert L., to Northrop Corporation. Theodolite target adaptor and method of use. 4,926,563, Cl. 33-293.000.

Smith, Robert S. Slip ring air bearing. 4,927,274, Cl. 384-101.000.

Smith, Roy E.; and Timan, Peter E., to UTDC Inc. Longitudinal steering linkage for truck with interaxle yokes. 4,926,756, Cl. 105-167.000.

Smith, Steve: *See*—
Smith, June; and Smith, Steve, 4,926,748, Cl. 100-34.000.

Smith, Terence M., to Thyssen Industrie AG. Apparatus for registering a scene, especially for its reproduction on the screen of a video monitor. 4,928,174, Cl. 358-108.000.

Smith, Terry E.: *See*—
Shih, Jenn S.; Smith, Terry E.; and Login, Robert B., 4,927,667, Cl. 427-154.000.

Smith, William: *See*—
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,926,632, Cl. 60-203.100.

Smook, Jan; Vos, Gerardus J. H.; Juijn, Johannes A.; and Van Hees, Theodorus J., to AKZO N.V. Process for preparing polyvinyl alcohol yarn. 4,927,586, Cl. 264-185.000.

Smoot, Lanny S., to Bell Communications Research, Inc. Teleconferencing terminal with camera behind display screen. 4,928,301, Cl. 379-53.000.

SMS Schloemann-Siemag Aktiengesellschaft: *See*—
Streubel, Hans, 4,926,929, Cl. 164-445.000.

Smyth, Malcolm R.: *See*—
Reading, Christopher L.; Smyth, Malcolm R.; and O'Kennedy, Richard, 4,927,502, Cl. 204-153.100.

Snead, Wilford A., to Unitek Corporation. Convertible buccal tube. 4,927,362, Cl. 433-17.000.

Snedeker, Marvin L., to Labeltape Meditect Inc. Medical electrode. 4,926,878, Cl. 128-798.000.

Snow Brand Milk Products Co., Ltd.: *See*—
Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, 4,927,959, Cl. 560-193.000.

Snowball, Malcolm R.; and Hayes, Cecil, to W. M. Still & Sons Limited. Apparatus with steam trap for heating and dispensing hot liquids. 4,927,060, Cl. 222-146.500.

Snyder, Keith A.: *See*—
Jones, Alan L.; Snyder, Keith A.; and Winkler, Paul E., 4,927,983, Cl. 174-258.000.

Snyder, Stephen J., to UAS Support, Inc. Sound attenuating laminate for jet aircraft engines. 4,926,963, Cl. 181-290.000.

Sobukawa, Hiroshi: *See*—
Okumura, Katsuya; Kuriyama, Fumio; Murai, Yukio; Tsujimura, Manabu; and Sobukawa, Hiroshi, 4,926,648, Cl. 62-55.500.

Societa' Cavi Pirelli S.p.A.: *See*—
Magnani, Francesco; and Minardi, Paolo, 4,927,294, Cl. 405-177.000.

Societa' Italiana per L'Esercizio Delle Telecomunicazioni P.A.: *See*—
D'Aria, Giovanna; and Taricco, Giorgio, 4,928,288, Cl. 375-17.000.

Societe Anonyme dite: Alcatel Espace: *See*—
Franchini, Elisabeth, 4,928,317, Cl. 455-601.000.

Societe Anonyme dite: ALCATEL SATMAN: *See*—
Krasuski, Marek; and Prugnolle, Bernard, 4,926,612, Cl. 53-69.000.

Societe Anonyme dite: L'Oreal: *See*—
Lapoiriere, Claudine; Mahieu, Claude; and Papantoniou, Christos, 4,927,883, Cl. 525-154.000.

Societe Anonyme dite : SMH Alcatel: *See*—
Vermesse, Bernard, 4,928,244, Cl. 364-464.020.
Vermesse, Bernard, 4,928,249, Cl. 364-518.000.

Societe Chimique des Charbonnages S.A.: *See*—
Villard, Alexandre; and Cotonea, Yves, 4,927,617, Cl. 423-396.000.

Societe d'Applications Generales d'Electricite et de Mecanique Sagem: *See*—
Lacuve, Jean, 4,927,256, Cl. 350-619.000.

Societe de Conseils de Recherches et d'Applications Scientifiques (S.C.R.A.S.): *See*—
Pirotzky, Eduardo; Dive, Georges; Godfroid, Jean-Jacques; and Heymans, Francoise, 4,927,825, Cl. 514-255.000.

Societe de Conseils de Recherches et d'Applicatios Scientifiques (S.C.R.A.S.): *See*—
De Lassauniere, Chabrier; and Colote, Acaye S., 4,927,755, Cl. 435-91.000.

Societe Nationale Elf Aquitaine (Production): *See*—
Arretz, Emmanuel P. E., 4,927,972, Cl. 568-70.000.

Sodagar, Eleanor H.: *See*—
Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.

Soejima, Katsumoto, to NEC Corporation. Method of producing semiconductor integrated circuit device including bipolar transistor and insulated gate field effect transistor. 4,927,776, Cl. 437-33.000.

Soejima, Yuji: *See*—
Takahashi, Akira; and Soejima, Yuji, 4,927,166, Cl. 280-91.000.

Sokal, Nathan O.: *See*—
Redl, Richard; and Sokal, Nathan O., 4,928,200, Cl. 361-93.000.

Solomon, Frank; and Genodman, Yury, to Eltech Systems Corporation. Platinum black air cathode, method of operating same, and layered gas diffusion electrode of improved inter-layer bonding. 4,927,514, Cl. 204-290.00R.

Soloveychik, Yakov G.; and Israel, Larry, to Visualtek, Inc. Automatic focus control for an image magnification system. 4,928,170, Cl. 358-94.000.

Somers, W. Karl: *See*—
Goble, E. Marlowe; Somers, W. Karl; and McGuire, David, 4,927,421, Cl. 606-73.000.

Sonesson, Harald V. Radio controllable spherical toy. 4,927,401, Cl. 446-456.000.

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Spehrley, Charles W., Jr.; Barss, Steven H.; Tomaszewski, David G.; and Hoisington, Paul A., 4,928,120, Cl. 346-140.00R.

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Davidson, James B.; Kaz, Peter N.; Kidwell, Michael H.; and Zachman, Mark E., 4,926,948, Cl. 172-4.500.

Spedding, Colin E.; and Pollard, Andrew, to GKN Technology Limited. Spring assemblies. 4,927,124, Cl. 267-229.000.

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Spencer, Charles P., to Amsted Industries Incorporated. Electrically grounded railway truck. 4,926,757, Cl. 105-224.100.

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Speranza, George P.; and Su, Wei-Yang, to Texaco Chemical Co. Method for the preparation of imidazoles. 4,927,942, Cl. 548-335.000.

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Pitt, Gilles D.; Jones, Roger E.; Antell, George R.; Spicer, Lyndon R.; Barnett, John A.; and Hill, Robert, 4,928,319, Cl. 455-612.000.

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Heinemann, Joachim; Spies, Karl-Heinz; Keller, Frank; Beicht, Bernd; Leitermann, Wulf; and Lechler, Rolf, 4,926,921, Cl. 160-115.000.

Spinney, Mark A.: *See*—
Robson, Michael J.; Cleare, Peter J. V.; and Spinney, Mark A., 4,927,852, Cl. 514-531.000.

Sponer, Gisbert: *See*—
Leinert, Herbert; Tsaklakidis, Christos; and Sponer, Gisbert, 4,927,834, Cl. 514-422.000.

Spong, Richard V.: *See*—
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Sportsman's Market, Inc.: *See*—
Sells, Charles C.; and Martin, Robert N., 4,926,838, Cl. 126-25.00A.

Springman, Charles G., to AMSTED Industries Incorporated. Conveyor chain having detachable member for carrying articles. 4,927,002, Cl. 198-487.100.

Springs Industries, Inc.: *See*—
Jaco, Pamela J.; and Tolbert, Thomas W., 4,927,698, Cl. 428-198.000.

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Rimai, Donald S.; and Sreekumar, Chandra, 4,927,727, Cl. 430-99.000.
Srzanna, Kurt, to Wolter, Peter. Rachet spanner with open mouth. 4,926,720, Cl. 81-61.000.
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Carruth, Walter L.; Jones, Warren P.; and Stacy, Richard B., 4,926,951, Cl. 177-144.000.
Staab, Carl J.; Houser, Kirk D.; Jones, Donald J.; Ihrman, Robert T.; Poepsel, Donald A.; and Edblad, Warren A., to Westinghouse Electric Corp. Real time process control using multiple communication networks. 4,928,097, Cl. 340-825.500.
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Staggs, Darrell W.: *See*—
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Standard Telephones Cables Public Limited Company: *See*—
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Stanley Aviation Corporation: *See*—
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Stanley Electric Co., Ltd.: *See*—
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Stapley, Gerald; Tate, Geoffrey; and Hardisty, Derek, to Security Services PLC. Remotely programmable key and programming means therefor. 4,926,665, Cl. 70-277.000.
Statz, Robert J.: *See*—
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Staub, Karl: *See*—
Fischer, Horst; and Staub, Karl, 4,927,332, Cl. 417-299.000.
Stavinoha, Jerome L.; and McCollum, Anthony W., to Eastman Kodak Company. Heat-curable compositions comprising a mixture of bis(2-hydroxyethyl) dicyclopentadiene-containing polyesters and unsaturated polyesters. 4,927,878, Cl. 525-44.000.
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Smith, Gary, 4,926,735, Cl. 84-453.000.
Stein, Herman H.; Pattner, Jacob J.; and Crowley, Steven R., to Abbott Laboratories. Glaucoma treatment. 4,927,807, Cl. 514-18.000.
Steinleitner, Gunther; and Roze, Philipp, to Asea Brown Boveri Aktiengesellschaft. Process for joining metallic and ceramic materials. 4,927,475, Cl. 156-89.000.
Steinmetz, Hans-Werner; and Reich, Fritz, to Georg Fischer Aktiengesellschaft. Adapting piece of thermoplastic material. 4,927,183, Cl. 285-21.000.
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Stemmle, Denis J., to Xerox Corporation. Sheet circulation in a duplex printer. 4,928,127, Cl. 346-160.000.
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Stern Metals, Inc.: *See*—
Kretchmer, Steven D., 4,927,070, Cl. 228-155.000.
Stevens, Timothy S.; Langhorst, Martin A.; and Randall, Osro W., III, to Dow Chemical Company, The. High performance anion-exchange chromatographic packing composition consisting of low porosity synthetic resin gel particle substrate coated with liquid water-soluble aminated resin. 4,927,539, Cl. 210-635.000.
Stewart, H. E.: *See*—
Oppenheim, A. K.; Stewart, H. E.; and Hom, K., 4,926,818, Cl. 123-297.000.
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Valev, Asaen, 4,926,800, Cl. 123-41.420.
Stice, James D.; Sievert, Chester E., Jr.; and Christian, Steven C., to Flexmedics Corporation. ARthroscopic instrumentation and method. 4,926,860, Cl. 606-144.000.
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Stolz, Robert; Mirring, Knut; Hein, Rudolf; Simon, Dieter; Raab, Lothar; and Glatz, Peter, to SKF GmbH. Pocket cage. 4,927,276, Cl. 384-572.000.
Stone, Robert A.; and Kish, Jules G., to United Technologies Corporation. Actuated spring clutch assembly. 4,926,991, Cl. 192-41.00S.
Stonewall Landscape Systems, Inc.: *See*—
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Storace, Anthony: *See*—
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Moy, Michael E.; Beavers, Kelly J.; Bray, Stuart W.; Goodknight, Frank A.; Kummli, Paul; Kutasy, Eugene; Lucchesi, Raymond L.; Munro, Frederick G.; Sellke, Richard G.; and Studebaker, Thomas J., 4,928,245, Cl. 364-513.000.
Stormon, Robert D. Putter. 4,927,144, Cl. 273-80.00A.
Stout, Gary K., to Du Pont de Nemours, E. I., and Company. Conformation of vacuum - laminated solder mask coated printed circuit boards by fluid pressurizing. 4,927,733, Cl. 430-256.000.
Stout, James T., to Mead Corporation, The. Article carrier. 4,927,009, Cl. 206-188.000.
Stover, William A.: *See*—
Anderson, Conroy D.; Chou, Tai-Sheng; Cormier, William E., Jr.; Dwyer, Francis G.; Krambeck, Frederick J.; Pasquale, Gary M.; Schipper, Paul H.; and Stover, William A., 4,927,526, Cl. 208-152.000.
Strait, Chad A.; Tabor, Ricky L.; and Lancaster, Gerald M., to Dow Chemical Company, The. Maleic anhydride graft copolymers having low yellowness index and films containing the same. 4,927,888, Cl. 525-285.000.
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Kirby, Neil V.; Street, Peter F. S.; and Markley, Lowell D., 4,927,833, Cl. 514-399.000.
Streubel, Hans, to SMS Schloemann-Siemag Aktiengesellschaft. Dummy bar for continuous casting machines. 4,926,929, Cl. 164-445.000.
Stribling, Donald: *See*—
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Stromswold, David C., to Mobil Oil Corporation. Method for monitoring the hydraulic fracturing of a subsurface formation. 4,926,940, Cl. 166-247.000.
Stuber, Istvan; Nagy, Geza; and Petrak, Peter. Apparatus for the relative increase of depth sharpness and improvement of resolving power of magnifying systems, particularly microscopes. 4,927,253, Cl. 350-508.000.
Stuber, Michael G.; and Effertz, Charles E., to Container Corporation. Insulated jacket for beverage container. 4,927,047, Cl. 220-90.200.
Stuber, Werner, to Behringwerke Aktiengesellschaft. Oligopeptidyl nitrile derivatives, agents containing them and their use. 4,927,809, Cl. 514-20.000.
Studebaker, Thomas J.: *See*—
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Suda, Shigeyuki, to Canon Kabushiki Kaisha. Optical system for compensating chromatic abberration of image. 4,927,250, Cl. 350-500.000.
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Sullivan, Donald K.: *See*—
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Sumitomo Chemical Company, Limited: *See*—
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Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; Inoue, Satoru; Sugano, Masayo; and Tanako, Hirotaka, 4,927,827, Cl. 514-256.000.
Matsuda, Masaaki; and Yoshida, Yuji, 4,927,541, Cl. 210-656.000.
Sumitomo Electric Industries, Ltd.: *See*—
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Suzuki, Fumio; Akasaka, Nobuhiro; and Honjo, Makoto, 4,927,585, Cl. 264-171.000.
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Kada, Yoshio, 4,927,311, Cl. 414-140.700.
Summer & Taylor, Inc.: *See*—
Raahauge, Jerald C., 4,928,121, Cl. 346-140.00R.
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Dachida, Otto, 4,926,908, Cl. 137-846.000.
Shekleton, Jack R., 4,926,630, Cl. 60-39.360.
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Survil, Robert J.; and Weber, Robert T., to Flow Design, Inc. Valve test plug. 4,926,704, Cl. 73-866.500.
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Heinhold, Hans, 4,927,054, Cl. 221-289.000.
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Yamaguchi, Mikio; Suzuki, Chiharu; Matsunari, Kenji; Miyazawa, Takeshige; and Nakamura, Yasuo, 4,927,448, Cl. 71-90.000.
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Suzuki, Makoto: *See*—
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Swanson, Melvin E., to Lidseen of North Carolina, Inc. Pipe bender. 4,926,672, Cl. 72-458.000.
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Swidwa, Kenneth J.: *See*—
Kaufmann, John W.; Swidwa, Kenneth J.; and Hornak, Leonard P., 4,927,595, Cl. 376-268.000.
Swindal, James L.; and Wiegand, Walter J., to United Technologies. Capacitive accelerometer with hinges on top and bottom surface. 4,928,203, Cl. 361-280.000.
Swinderman, Robert T.; and Mueller, David W., to Martin Engineering Company. Heated conveyor belt cleaner. 4,927,003, Cl. 198-497.000.
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Syme, Robert W.; and McKenna, Michael E. Insulating laminate. 4,927,705, Cl. 428-282.000.
Synektron Corporation: *See*—
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Syntex (U.S.A.) Inc.: *See*—
Walker, Keith A. M.; and Kertesz, Denis J., 4,927,963, Cl. 562-501.000.
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Hamilton, Thomas W., 4,926,583, Cl. 47-1.010.
Tabler, Donald C.; and Johnson, Marvin M., to Phillips Petroleum Company. Passivation of metal contaminated cracking catalysts. 4,927,795, Cl. 502-33.000.
Tabor, Ricky L.: *See*—
Strait, Chad A.; Tabor, Ricky L.; and Lancaster, Gerald M., 4,927,888, Cl. 525-285.000.
Tachi, Susumu: *See*—
Arai, Hirohiko; and Tachi, Susumu, 4,928,047, Cl. 318-568.160.
Tachibana, Sadao: *See*—
Aoki, Kazuo; Chiba, Toshimi; Tachibana, Sadao; and Nagatomo, Yasushi, 4,927,990, Cl. 200-517.000.
Tachibana, Suguru: *See*—
Higuchi, Hisayuki; Homma, Noriyuki; Suzuki, Makoto; and Tachibana, Suguru, 4,928,265, Cl. 365-189.010.
Tachizawa, Shingo: *See*—
Fuchigami, Mitsuru; Tachizawa, Shingo; and Ishiguro, Mamoru, 4,927,971, Cl. 564-505.000.
Tadokoro, Tomoo; Tashima, Seiji; Okimoto, Haruo; Akagi, Toshimichi; Nakao, Masami; Matsuda, Ikuo; and Suekuni, Einosuke, to Mazda Motor Corporation. Engine-control apparatus. 4,926,636, Cl. 60-312.000.
Taft, Philip A.: *See*—
Harrison, Anthony W.; and Taft, Philip A., 4,927,212, Cl. 303-115.000.
Tagashira, Eijiro: *See*—
Inagaki, Tetsuya; Tagashira, Eijiro; Takaya, Masahiro; and Nishimura, Yasuhiro, 4,927,817, Cl. 514-184.000.

Tahara, Hideo: *See*—
Makihara, Nobuo; and Tahara, Hideo, 4,927,392, Cl. 440-88.000.

Tahara, Kazuo: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.

Taillebois, Jacques: *See*—
Chovin, Andre ; and Taillebois, Jacques, 4,928,270, Cl. 368-82.000.

Takafuji, Yutaka, to Sharp Kabushiki Kaisha. Projection type liquid crystal display device. 4,928,123, Cl. 353-20.000.

Takagi, Yoshio: *See*—
Miyashita, Tsuneo; Nishio, Hiroaki; Yabuta, Kazuya; and Takagi, Yoshio, 4,927,600, Cl. 419-49.000.

Takahashi, Akira; and Soejima, Yuji, to Fuji Jukogyo Kabushiki Kaisha. Rear wheel steering device for automotive vehicles. 4,927,166, Cl. 280-91.000.

Takahashi, Akira; and Koishi, Musubu, to Hamamatsu Photonics Kabushiki Kaisha. Light source driving device. 4,928,248, Cl. 372-38.000.

Takahashi, Eiji: *See*—
Hayashida, Suetou; Kimura, Kyoichiro; and Takahashi, Eiji, 4,927,885, Cl. 525-211.000.
Yamagishi, Takanori; Idai, Tsutomu; and Takahashi, Eiji, 4,927,979, Cl. 568-791.000.

Takahashi, Katsuhiko: *See*—
Nakane, Toshio; Hijikata, Kenji; Kageyama, Yukihiko; and Takahashi, Katsuhiko, 4,927,895, Cl. 525-438.000.

Takahashi, Katsumasa, to Kitagawa Industries Co., Ltd. Board mount. 4,927,111, Cl. 248-500.000.

Takahashi, Kimihide; Sasaki, Hidemi; and Nakayama, Yoshiaki, to Fuji Photo Film Co., Ltd. Video camera capable of effecting remote control operation. 4,928,179, Cl. 358-210.000.

Takahashi, Masaharu; and Yoshida, Takeo, to Shin-Etsu Chemical Co., Ltd. Method for manufacturing extrusion molded silicone insulating articles. 4,927,587, Cl. 264-211.000.

Takahashi, Ryuichi, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent polymerizable compound, and polar compound. 4,927,731, Cl. 430-138.000.

Takahashi, Satoshi: *See*—
Nakamura, Hisashi; Takahashi, Satoshi; Ikeda, Takayuki; and Ogino, Masaaki, 4,926,902, Cl. 137-493.300.

Takahashi, Shigeyuki: *See*—
Ito, Toshiyasu; Minoura, Jun; Takahashi, Shigeyuki; Mori, Takaaki; Kato, Mamoru; and Funahashi, Toshikazu, 4,927,246, Cl. 350-357.000.

Takahashi, Shuzo; Tsuchida, Yutaka; Osada, Shiro; Hasebe, Nobuhisa; and Nakada, Masayuki, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha; and Nippon Kokan Kabushiki Kaisha. Pouring apparatus for moving-mold type continuous casting machine. 4,926,925, Cl. 164-154.000.

Takahashi, Tadashi: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.

Takahashi, Tsukasa: *See*—
Osaka, Shigemi; Hata, Kazuo; and Takahashi, Tsukasa, 4,927,560, Cl. 252-315.100.

Takahashi, Toshinori: *See*—
Inui, Shuji; Hiramitsu, Tetsushi; Takahaski, Toshinori; Tamaki, Makoto; Kikuta, Mitsuhiro; and Mizutani, Junichi, 4,927,364, Cl. 439-15.000.

Takamatsu, Shuichi: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.

Takao, Koji: *See*—
Koyanagi, Haruo; Kumasaka, Hideyuki; Takao, Koji; and Noda, Tomohiko, 4,926,544, Cl. 29-703.000.

Takara Shuzo Co., Ltd.: *See*—
Sakai, Takeshi; Matsui, Susumu; Akiyoshi, Sumiko; and Obayashi, Akira, 4,927,753, Cl. 435-26.000.
Sakai, Takeshi; Yokota, Hiroko; Yamamoto, Kazuki; Yokoyama, Sadaji; Matsui, Susumu; Kato, Ikunoshin; and Obayashi, Akira, 4,927,767, Cl. 436-64.000.

Takase, Haruo; Uenaka, Kazushige; Abe, Akira; and Fujita, Yoshihiro, to Fuji Photo Film Co., Ltd. Water deionizing apparatus. 4,927,533, Cl. 210-257.100.

Takashi, Yamaoko, to Precision Fukuhara Works, Ltd. Method of knitting jacquard knit fabric by circular knitting machine. 4,926,660, Cl. 66-9.00R.

Takashima, Yuji: *See*—
Yamamoto, Hajime; Takashima, Yuji; Kitagaki, Kazunori; and Nakamura, Masahiko, 4,927,724, Cl. 430-45.000.

Takatsuna, Kazutoshi; Shiozawa, Kouji; and Okumura, Yoshiharu, to Tosen Corporation. Process for preparing aminopropyl silanes. 4,927,953, Cl. 556-413.000.

Takaya, Masahiro: *See*—
Inagaki, Tetsuya; Tagashira, Eijiro; Takaya, Masahiro; and Nishimura, Yasuhiro, 4,927,817, Cl. 514-184.000.

Takaya, Masanori: *See*—
Hotta, Saburo; Kikuchi, Yoshiaki; Takaya, Masanori; and Inoue, Takashi, 4,927,455, Cl. 71-64.130.

Takaya, Takao; Sakane, Kazuo; Miyai, Kenzi; and Kawabata, Kohji, to Fujisawa Pharmaceutical Co., Ltd. Cephem compounds and processes for preparation thereof. 4,927,818, Cl. 514-202.000.

Takayama, Toru: *See*—
Hirose, Naoki; Inujima, Takashi; and Takayama, Toru, 4,926,791, Cl. 118-723.000.

Takeda Chemical Industries, Ltd.: *See*—
Naito, Kenzo; Ishibashi, Yukio; and Shinbo, Haruo, 4,927,964, Cl. 562-560.000.

Takei, Makoto; and Tamura, Mamoru, to Ohwada Carbon Industrial Co., Ltd. Press cylinder for high-temperature, high-pressure pressing machine. 4,927,345, Cl. 424-4.000.

Takeshita, Yasuyoshi: *See*—
Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, 4,927,959, Cl. 560-193.000.

Takeuchi, Toshiyuki, to Graphtec Kabushiki Kaisha. Thermal printout density control. 4,928,117, Cl. 346-76.0PH.

Takizuka, Hiroshi: *See*—
Kitamura, Yoshio; Takizuka, Hiroshi; and Ishihara, Tadao, 4,928,234, Cl. 364-200.000.

Taltre, Abraham K. Therapeutic back rest. 4,927,139, Cl. 272-144.000.

Tamagawa Seiki Kabushiki Kaisha: *See*—
Karasawa, Yutaka, 4,928,046, Cl. 318-654.000.

Tamagawa, Shigehisa, to Fuji Photo Film Co., Ltd. Support for photographic printing paper. 4,927,495, Cl. 162-135.000.

Tamaki, Makoto: *See*—
Inui, Shuji; Hiramitsu, Tetsushi; Takahaski, Toshinori; Tamaki, Makoto; Kikuta, Mitsuhiro; and Mizutani, Junichi, 4,927,364, Cl. 439-15.000.

Tamamura, Masaya: *See*—
Shimotsuhama, Isao; Emori, Shinji; Watanabe, Yoshio; and Tamamura, Masaya, 4,928,024, Cl. 307-455.000.

Tameran, Inc.: *See*—
Wise, David S., 4,928,140, Cl. 355-48.000.

Tamoto, Koji, to Fuji Photo Film Co., Ltd. Silver halide photographic light-sensitive materials having specified coupler, dir coupler and silver coverage. 4,927,743, Cl. 430-496.000.

Tamura, Haruhisa; Yamasaki, Takahiko; and Hasegawa, Mitsuhiro, to Matsushita Electric Industrial Co., Ltd. Apparatus for cooking by electric heating including means for providing intermittent temperature control thereof. 4,927,998, Cl. 219-494.000.

Tamura, Hiroki: *See*—
Imoto, Koji; Omura, Tadao; Kataoka, Yoichi; Nakajima, Kunihiko; Maekawa, Motoyuki; Tamura, Hiroki; and Shioya, Yoshiaki, 4,926,817, Cl. 123-292.000.

Tamura, Mamoru: *See*—
Takei, Makoto; and Tamura, Mamoru, 4,927,345, Cl. 424-4.000.

Tamura, Mitsunobu; Tsuchihashi, Toshifumi; and Kenmochi, Toshihisa, to Yokohama Rubber Co., Ltd., The; and Honda Giken Kogyo Kabushiki Kaisha. Apparatus for producing honeycomb panels. 4,927,358, Cl. 432-204.000.

Tanaka, Akira: *See*—
Miyajima, Nobukazu; Tanaka, Akira; and Shinoda, Masaru, 4,926,862, Cl. 428-419.00D.

Tanaka, Hironori; Kotani, Matahira; and Matsumoto, Masafumi, to Sharp Kabushiki Kaisha. Automatic sheet feeder. 4,927,130, Cl. 271-10.000.

Tanaka, Hiroyuki, to NIX Company, Ltd. Information-bearing sheet for X-ray film. 4,928,298, Cl. 378-162.000.

Tanaka, Koji; Ueda, Minoru; and Masuda, Taizo, to Japan Exlan Company Limited. Matting agent. 4,927,710, Cl. 428-394.000.

Tanaka, Masato, to Sony Corporation. Automatic equalizer. 4,928,287, Cl. 375-13.000.

Tanaka, Seiichi; Koike, Yutaka; Nakano, Masato; Atsuumi, Shugo; Morishima, Hajime; and Matsuyama, Kenji, to Banyu Pharmaceutical Co., Ltd. 5-substituted amino-4-hydroxy-pentenoic acid derivatives and their use. 4,927,565, Cl. 260-404.500.

Tanaka, Shigeo: *See*—
Matsushima, Yasunobu; Tanaka, Shigeo; Aoki, Tomoyuki; and Ono, Yohji, 4,927,472, Cl. 148-261.000.

Tanaka, Shigeru, to Kabushiki Kaisha Toshiba. High-voltage generating device for use with an X-ray tube. 4,928,295, Cl. 378-104.000.

Tanaka, Shinichi: *See*—
Tanaka, Yasuhiro; Sunohara, Masaaki; Nakajima, Yasuo; and Tanaka, Shinichi, 4,927,247, Cl. 350-432.000.

Tanaka, Toshinori: *See*—
Morishita, Akira; Tanaka, Toshinori; and Isozumi, Shuzoo, 4,926,705, Cl. 74-6.000.

Tanaka, Toshiyuki; Kuga, Shigeki; Nakamura, Nobuo; Morishita, Taro; and Wada, Masahiro, to Sharp Kabushiki Kaisha. Display method in an inference trace of an expert system. 4,928,236, Cl. 364-513.000.

Tanaka, Yasuhiro; Sunohara, Masaaki; Nakajima, Yasuo; and Tanaka, Shinichi, to Matsushita Electric Industrial Co., Ltd. Objective lens for optical disk system and optical head using the same. 4,927,247, Cl. 350-432.000.

Tanaka, Yoshiyasu; Nagaishi, Toshimi; and Suzuki, Mituyoshi, to Du Pont de Nemours, E. I., and Company. Optical cable coupling adapter. 4,927,229, Cl. 350-96.210.

Tanako, Hirotaka: *See*—
Katoh, Tsuguhiro; Maeda, Kiyoto; Shiroshita, Masao; Yamashita, Norihisa; Sanemitsu, Yuzuru; Inoue, Satoru; Sugano, Masayo; and Tanako, Hirotaka, 4,927,827, Cl. 514-256.000.

Tandy Corporation: *See*—
Siddiq, Mohammed, 4,928,189, Cl. 360-128.000.

Tang, Ching W.: *See*—
Scozzafava, Michael; Tang, Ching W.; and Young, Ralph H., 4,927,726, Cl. 430-78.000.

Tani, Junichi: *See*—
Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, 4,926,906, Cl. 137-625.300.

Taniguchi, Masaharu; Ichijo, Chikara; and Fujikawa, Junichi, to Toray Industries, Inc. Photosensitive composition containing a gelling agent. 4,927,739, Cl. 430-286.000.

Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Photographic camera. 4,928,124, Cl. 354-106.000.

Taniguchi, Osamu; Onitsuka, Yoshihiro; and Mihara, Tadashi, to Canon Kabushiki Kaisha. Method and apparatus for driving optical modulation device. 4,927,243, Cl. 350-350.00S.

Tanizawa, Tetsu, to Fujitsu Limited. Integrated circuit device having a chip. 4,928,164, Cl. 357-45.000.

Tansky, John L.; Lagan, Edward F., Jr.; and McGarry, Patrick J., to Mars Incorporated. Coin operated telephone operation monitoring switch mounting arrangement. 4,928,299, Cl. 379-37.000.

Tarel Seven Design, Inc.: *See*—
Leopold, Arthur B., 4,926,796, Cl. 119-83.000.

Taricco, Giorgio: *See*—
D'Aria, Giovanna; and Taricco, Giorgio, 4,928,288, Cl. 375-17.000.

Tashima, Seiji: *See*—
Tadokoro, Tomoo; Tashima, Seiji; Okimoto, Haruo; Akagi, Toshimichi; Nakao, Masami; Matsuda, Ikuo; and Suekuni, Einosuke, 4,926,636, Cl. 60-312.000.

Tate, David P.; and Graves, Daniel F., to Bridgestone/Firestone, Inc. Modified rubber compositions containing aromatic six-membered heterocyclic nitrogen-containing groups. 4,927,887, Cl. 525-279.000.

Tate, Geoffrey: *See*—
Stapley, Gerald; Tate, Geoffrey; and Hardisty, Derek, 4,926,665, Cl. 70-277.000.

Tate & Lyle PLC: *See*—
Jenner, Michael R.; and Jackson, Graham, 4,927,646, Cl. 426-96.000.

Tatsumi, Setsuji; Shiota, Kazuo; Urabe, Hitoshi; and Shimazaki, Osamu, to Fuji Photo Film Co., Ltd. Method of and apparatus for executing tone correction on an image according to a correction level. 4,928,167, Cl. 358-80.000.

Tatsumi, Takumi: *See*—
Hirano, Sadayuki; Murano, Katsuaki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,926,716, Cl. 74-866.000.

Tatsuzaki, Toru: *See*—
Ishikura, Hisatugu; Tahara, Kazuo; Abukawa, Toshimi; Marumoto, Katsuji; Koterazaka, Toshiyuki; Hombu, Mitsuyuki; Takahashi, Tadashi; Yamamura, Hirohisa; Tatsuzaki, Toru; Ohmae, Tsutomu; and Takamatsu, Shuichi, 4,926,960, Cl. 180-79.100.

Tauber, Gunter; and Dornauf, Andrea, to Schott Glaswerke. Reference electrode having immobilized electrolyte. 4,927,518, Cl. 204-421.000.

Taubitz, Bernd; Zieher, Peter; Kramer, Claus; Engelsdorf, Kurt; and Schuelke, Armin, to Robert Bosch GmbH. Hydraulic shock absorber. 4,926,983, Cl. 188-299.000.

Taubitz, Bernd: *See*—
Harms, Klaus; Schray, Hans-Dieter; Taubitz, Bernd; and Wirtz, Rainer, 4,928,042, Cl. 318-254.000.

Taylor, Barry: *See*—
Adams, Frederic R.; Boyer, Jeffrey M.; Schultz, Ronald N.; and Taylor, Barry, 4,926,959, Cl. 180-315.000.

Taylor, Edward C.; Beardsley, George P.; Shih, Chuan; and Fletcher, Stephen R., to Princeton University, The Trustees of. Diastereoisomeric tetrahydropyrido-(2,3,d) pyrimidine derivatives. 4,927,828, Cl. 514-258.000.

Taylor, Steven C. Installer's briefcase. 4,927,021, Cl. 206-373.000.

Tazaki, Taketoshi: *See*—
Hara, Masaaki; Nishikawa, Seigo; Tazaki, Taketoshi; and Inokuchi, Hiroshi, 4,926,604, Cl. 51-165.880.

Tchetchick, Doron: *See*—
Zilberman, Moshe; Livne, Mordechai; Tchetchick, Doron; and Daniel, Moshe, 4,926,684, Cl. 73-147.000.

TDK Corporation: *See*—
Ezaki, Joichiro; Ito, Yoshiaki; and Matsuzaki, Mikio, 4,928,195, Cl. 360-103.000.

Technolizenz Establishment: *See*—
Lichka, Helmut J., 4,927,045, Cl. 220-88.00R.

Tecumseh Products Company: *See*—
Bonde, Kevin G., 4,926,813, Cl. 123-195.0HC.
Bonde, Kevin G., 4,926,814, Cl. 123-196.00W.
Kandler, William C., 4,926,808, Cl. 123-187.50R.

Teijin Limited: *See*—
Kitahara, Shigehisa; Ohtsu, Akira; and Fujii, Katsuhiko, 4,927,808, Cl. 514-19.000.

Teikoku Tsushin Kogyo Co., Ltd.: *See*—
Yagi, Nobuyuki; Inagaki, Jiro; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,928,082, Cl. 338-174.000.

Teitz, Yael, to Ramot Univ. Authority for Applied Res. & Devp. Ltd. Antiviral compositions. 4,927,843, Cl. 514-418.000.

Tektronix, Inc.: *See*—
Heidtmann, Denis L.; and Blouke, Morley M., 4,928,003, Cl. 250-211.00J.

Telefind Corporation: *See*—
Andros, Andrew A.; and Campana, Thomas J., 4,928,100, Cl. 340-825.440.

Telemus Electronic Systems, Inc.: *See*—
Langner, Paul, 4,928,105, Cl. 342-192.000.

Tellechea, Carlos: *See*—
Walls, John E.; Tellechea, Carlos; and Dhillon, Major S., 4,927,737, Cl. 430-278.000.

Temple, Victor A. K.: *See*—
Arthur, Stephen D.; and Temple, Victor A. K., 4,927,772, Cl. 437-6.000.

Templeton, James H.: *See*—
Speranza, George P.; Lin, Jiang-Jen; and Templeton, James H., 4,927,912, Cl. 528-405.000.

Tennessee Valley Authority: *See*—
Schohl, Gerald A.; and Vigander, Svein, 4,926,675, Cl. 73-19.000.

Terada, Takami: *See*—
Tsumura, Kenji; Yamada, Yukifumi; and Terada, Takami, 4,927,110, Cl. 248-430.000.

Teraoka, Kazuharu; Satake, Mitsuo; Denda, Toshio; Katayama, Takashi; and Seyasu, Shiro, to Teraoka Seiko Co., Ltd. Label printer. 4,928,229, Cl. 364-464.010.

Teraoka Seiko Co., Ltd.: *See*—
Teraoka, Kazuharu; Satake, Mitsuo; Denda, Toshio; Katayama, Takashi; and Seyasu, Shiro, 4,928,229, Cl. 364-464.010.

Terayama, Yoshimi: *See*—
Yoshizawa, Tetsuo; Terayama, Yoshimi; Kondo, Hiroshi; Sakaki, Takashi; Haga, Shunichi; Ichida, Yasuteru; and Konishi, Masaki, 4,926,549, Cl. 29-876.000.

Terraillon, societe anonyme: *See*—
Gagnepain, Didier, 4,926,521, Cl. 16-110.00A.

Terumo Kabushiki Kaisha: *See*—
Yamaguchi, Shuichiro; Uchida, Naoto; Shimomura, Takeshi; and Oyama, Noboru, 4,927,516, Cl. 204-403.000.

Terumo Kabushiki Kaisha (Terumo Corporation): *See*—
Seita, Yukio; and Emi, Makoto, 4,927,576, Cl. 264-49.000.

Terzis, Nicholas C.: *See*—
Green, James A.; and Terzis, Nicholas C., 4,927,238, Cl. 350-130.000.

Texaco Chemical Company: *See*—
Speranza, George P.; Lin, Jiang-Jen; and Templeton, James H., 4,927,912, Cl. 528-405.000.
Speranza, George P.; and Su, Wei-Yang, 4,927,942, Cl. 548-335.000.

Texaco Inc.: *See*—
Karol, Thomas J.; and Nalesnik, Theodore E., 4,927,562, Cl. 252-51.50A.

Texas Instruments Incorporated: *See*—
Baglee, David A.; and Parker, Ronald N., 4,928,267, Cl. 365-218.000.
Marshall, Steven P., 4,928,023, Cl. 307-443.000.
Miles, Philip D.; Moody, John R., Jr.; and O'Keefe, Sheila, 4,928,062, Cl. 324-158.00R.
Misium, George R., 4,928,018, Cl. 250-492.200.

Texas Iron Works, Inc.: *See*—
Braddick, Britt O., 4,926,936, Cl. 166-217.000.

Textron Inc.: *See*—
Gassen, James, 4,926,637, Cl. 60-317.000.

Teyssie, Philippe; Varshney, Sunil K.; Jerome, Robert; and Fayt, Roger, to Norsolor. Process for the anionic polymerization of acrylic monomers and optionally of vinyl comonomers. 4,927,703, Cl. 428-220.000.

Tezuka, Toshiaki: *See*—
Koshizuka, Kunihiro; Tezuka, Toshiaki; Abe, Takao; and Ebisawa, Harue, 4,927,693, Cl. 428-141.000.

Th. Goldschmidt AG: *See*—
Fock, Jurgen; and Schedlitzki, Dietmar, 4,927,961, Cl. 562-103.000.

Thaler, Dietmar: *See*—
Bruehl, Klaus; and Thaler, Dietmar, 4,926,981, Cl. 188-111.000.

Theeten, Jean-Bernard; Autier, Philippe; and Auger, Jean Marc, to U.S. Philips Corporation. Method of manufacturing semiconductor devices. 4,927,785, Cl. 437-225.000.

Theeuwes, Felix: *See*—
Haak, Ronald P.; Theeuwes, Felix; and Gyory, J. Richard, 4,927,408, Cl. 604-20.000.

Theiling Jr., Louis F.: *See*—
Knopf, Robert J.; Theiling Jr., Louis F.; and Berti, Leroy P., 4,927,954, Cl. 558-441.000.

Theophilou, Nicolas: *See*—
Naarmann, Herbert; and Theophilou, Nicolas, 4,927,578, Cl. 264-81.000.

Thermo King Corporation: *See*—
King, Donald D., 4,926,655, Cl. 62-244.000.

Thetford Corporation: *See*—
Sargent, Charles L.; Antos, John M.; and Biba, Scott I., 4,926,508, Cl. 4-329.000.

Thiele, Karl E.: *See*—
Brock-Fisher, George A.; Kranz, Paul R.; Mniece, James R.; Thiele, Karl E.; Savord, Bernard J.; and Smith, Richard B., 4,926,872, Cl. 128-661.010.

Thomas, J. W. No-till drill providing seed and fertilizer separation. 4,926,767, Cl. 111-187.000.

Thomas, Mary P.: *See*—
Sevrain, Christophe Jean-Paul; Schramm, Heather R.; Schmidt, Daniel G.; Hooper, Paul S.; and Thomas, Mary P., 4,926,879, Cl. 128-798.000.

Thomas, Ronald E.: *See*—
Lesk, Israel A.; Thomas, Ronald E.; Hawkins, George W.; and Rugg, James M., 4,928,162, Cl. 357-72.000.

Thomas, William D.: *See*—
Crawley, H. Bert; Rosenberg, Eli I.; Meyer, W. Thomas; Gorbics, Mark S.; Thomas, William D.; McKay, Roy L.; and Homer, John F., Jr., 4,928,246, Cl. 364-514.000.
Thompson, Gregory E.; and Thompson, Paul V. Cast decoration kit. 4,927,025, Cl. 206-575.000.
Thompson, Paul V.: *See*—
Thompson, Gregory E.; and Thompson, Paul V., 4,927,025, Cl. 206-575.000.
Thompson, Wayne J.: *See*—
Eilon, Gabriel F.; and Thompson, Wayne J., 4,927,965, Cl. 562-560.000.
Thomson-CSF: *See*—
Devaux, Francois; Herail, Norbert; Lefevre, Denis; and Lehuede, Jean-Pierre, 4,928,077, Cl. 333-111.000.
Lefevre, Herve ; Bettini, Jean-Pierre; Botti, Serge; and Turpin, Marc, 4,928,005, Cl. 250-227.230.
Papuchon, Michel; Pocholle, Jean-Paul; and Delacourt, Dominique, 4,927,245, Cl. 350-354.000.
Pocholle, Jean P.; Papuchon, Michel; Puech, Claude; and Tournois, Pierre, 4,927,223, Cl. 350-96.150.
Thorston, Earl K., Jr.: *See*—
Parker, Tim; Edwards, Robert M.; Magnotta, Frank A.; Laprade, Jean-Paul; Smith, Donald R.; Sodagar, Eleanor H.; Anemaet, John M.; Benoit, Dennis R.; Thornton, Earl K., Jr.; and Galante, Richard J., 4,927,709, Cl. 428-352.000.
Thrasher, Robert, Jr.: *See*—
Mayer, Ronald F.; and Thrasher, Robert, Jr., 4,927,203, Cl. 292-201.000.
Thrlik, Jiri , to Elitex koncern textilniho strojirenstvi. Device for checking cylindrical bodies, especially tubes of open-end spinning machines. 4,927,029, Cl. 209-538.000.
Thukakoshi, Thuneo: *See*—
Nakagawa, Akio; Ohashi, Hiromichi; Yamaguchi, Yoshihiro; Watanabe, Kiminori; and Thukakoshi, Thuneo, 4,928,155, Cl. 357-23.400.
Thurne Engineering Co., Ltd.: *See*—
Hoyland, Trevor B.; and Payne, Richard, 4,927,000, Cl. 198-418.400.
Thurner, Gunther: *See*—
Wittman, Jurgen; von Entress-Fursteneck, Wolfgang; and Thurner, Gunther, 4,926,751, Cl. 102-348.000.
Thyssen Industrie AG: *See*—
Smith, Terence M., 4,928,174, Cl. 358-108.000.
Tidd, Jonathan L.: *See*—
Frost, Martin; Horton, Bruce J.; and Tidd, Jonathan L., 4,926,603, Cl. 51-165.770.
Tilley, Jefferson W.: *See*—
Guthrie, Robert W.; Kierstead, Richard W.; and Tilley, Jefferson W., 4,927,826, Cl. 514-256.000.
Guthrie, Robert W.; Kierstead, Richard W.; Mullin, John G.; and Tilley, Jefferson W., 4,927,838, Cl. 514-337.000.
Timan, Peter E.: *See*—
Smith, Roy E.; and Timan, Peter E., 4,926,756, Cl. 105-167.000.
Tioxide Group PLC: *See*—
Cowie, Alan G., 4,927,464, Cl. 106-436.000.
Tischer, Kurt-Manfred: *See*—
Mayer, Uwe; and Tischer, Kurt-Manfred, 4,928,041, Cl. 315-366.000.
Tobbe, Joseph D.: *See*—
Carlson, James R.; and Tobbe, Joseph D., 4,926,523, Cl. 16-125.000.
Tobin, Philip J.: *See*—
Roth, Scott S.; Nguyen, Bich-Yen; Tobin, Philip J.; Ray, Wayne; Wachholz, E. Petyr; and Wissen, Glenn, 4,927,780, Cl. 437-69.000.
Todaro, Frank A.: *See*—
Abildgaard, William H.; Chadwick, Charles; Hotkowski, Peter; and Todaro, Frank A., 4,927,310, Cl. 412-7.000.
Toja, Emilio: *See*—
Galliani, Giulio; Barzaghi, Fernando; Bonetti, Carla; and Toja, Emilio, 4,927,837, Cl. 514-331.000.
Tokai Corp.: *See*—
Nitta, Tomio, 4,927,747, Cl. 431-344.000.
Tokitoh, Yasuo: *See*—
Maeda, Toshihiko; Tokitoh, Yasuo; and Yoshimura, Noriaki, 4,927,960, Cl. 562-512.000.
Tokumitsu, Jun, to Canon Kabushiki Kaisha. Optical switch array provided with a mask having openings of a predetermined pattern and shutters corresponding to the pattern. 4,927,230, Cl. 350-96.240.
Tokumo, Akio: *See*—
Yamamoto, Hideo; Sato, Takeshi; Yoshinsi, Toshikazu; Mori, Shuichi; and Tokumo, Akio, 4,928,071, Cl. 330-129.000.
Tokyo Electric Co., Ltd.: *See*—
Muroi, Hidenori, 4,928,279, Cl. 371-11.200.
Tolbert, Thomas W.: *See*—
Jaco, Pamela J.; and Tolbert, Thomas W., 4,927,698, Cl. 428-198.000.
Tomaszewski, David G.: *See*—
Spehrley, Charles W., Jr.; Barsa, Steven H.; Tomaszewski, David G.; and Hoisington, Paul A., 4,928,120, Cl. 346-140.00R.
Tomforde, Johann; and Wall, Monika, to Daimler-Benz Aktiengesellschaft. Presentation podium. 4,927,106, Cl. 248-146.000.
Tomikawa, Kazuto; and Fujie, Hideo, to Toshiba Kikai Kabushiki Kaisha. System for compensatively correcting for displacements due to heat in machine tools. 4,928,019, Cl. 250-561.000.
Tomita, Koji: *See*—
Konishi, Masataka; Shimizu, Keiko; Ohbayashi, Masaru; Tomita, Koji; Miyaki, Takeo; and Oki, Toshikazu, 4,927,848, Cl. 514-453.000.
Tomkiel, Stanley, to National Medical Device Corporation. User-protective hypodermic syringe holder. 4,927,416, Cl. 604-198.000.
Tomlinson, Robert A. Push rod tube for high lift rocker arms. 4,926,805, Cl. 123-90.610.
Tommerson, David P.; and Brekkestran, Kevin L., to Environwear, Inc. Fused electrical connector with sewing wings. 4,927,366, Cl. 439-37.000.
Tomoe Technical Research Company: *See*—
Kawai, Kouzi, 4,926,903, Cl. 137-554.000.
Tompkins, David J., to Kontron Instruments Holdings, NV. Pipetting method and apparatus. 4,926,701, Cl. 73-864.150.
Tone, Masatsugu: *See*—
Murakawa, Masatake; Bando, Niro; Tone, Masatsugu; Yuki, Mikio; Miyata, Junji; Hayashi, Tetsuaki; and Kurohara, Kazuaki, 4,926,624, Cl. 56-202.000.
Tonen Corporation: *See*—
Takatsuna, Kazutoshi; Shiozawa, Kouji; and Okumura, Yoshiharu, 4,927,953, Cl. 556-413.000.
Topia Industry Co., Ltd.: *See*—
Shimazaki, Fumio, 4,926,922, Cl. 160-331.000.
Toray Industries, Inc.: *See*—
Nagura, Satoru; Ebihara, Tsutomu; and Matsumoto, Toshihide, 4,927,682, Cl. 428-88.000.
Taniguchi, Masaharu; Ichijo, Chikara; and Fujikawa, Junichi, 4,927,739, Cl. 430-286.000.
Torisawa, Akira; Kakizaki, Masaaki; Ito, Noriaki; and Yoshimura, Shigeru, to Canon Kabushiki Kaisha. Recorder. 4,928,050, Cl. 318-696.000.
Torras, Robert M. Mowing tractor with towed mower. 4,926,621, Cl. 56-6.000.
Torrington Company, The: *See*—
Lawson, James L., 4,927,275, Cl. 384-117.000.
Toshiba Corp.: *See*—
Okumura, Katsuya; Kuriyama, Fumio; Murai, Yukio; Tsujimura, Manabu; and Sobukawa, Hiroshi, 4,926,648, Cl. 62-55.500.
Toshiba Kikai Kabushiki Kaisha: *See*—
Tomikawa, Kazuto; and Fujie, Hideo, 4,928,019, Cl. 250-561.000.
Toshiba Shilicone Co., Ltd.: *See*—
Kabeta, Keiji; and Zenbayashi, Michio, 4,927,949, Cl. 556-413.000.
Toshiba Silicone Co., Ltd.: *See*—
Kabeta, Keiji; and Syuto, Kiyoaki, 4,927,951, Cl. 556-419.000.
Tosoh Corporation: *See*—
Sakamoto, Kiyoaki; Matsubara, Kenichi; Nakahara, Yasuhiro; and Nomura, Masaki, 4,927,531, Cl. 210-198.200.
Toto Ltd.: *See*—
Higuchi, Mitsuhiro; and Yamamoto, Hirofumi, 4,926,504, Cl. 4-247.000.
Higuchi, Mitsuhiro; Yamamoto, Hirofumi; Yamamoto, Osamu; Fujii, Shokichi; and Nonomura, Katsumi, 4,926,505, Cl. 4-247.000.
Tournois, Pierre: *See*—
Pocholle, Jean P.; Papuchon, Michel; Puech, Claude; and Tournois, Pierre, 4,927,223, Cl. 350-96.150.
Townsend, Leroy B.; and Drach, John C., to University of Michigan, The Regents of the. Acyclic pyrrolo[2,3-D]pyrimidine analogs as antiviral agents. 4,927,830, Cl. 514-258.000.
Toyoda Gosei Co., Ltd.: *See*—
Inui, Shuji; Hiramitsu, Tetsushi; Takahaski, Toshinori; Tamaki, Makoto; Kikuta, Mitsuhiro; and Mizutani, Junichi, 4,927,364, Cl. 439-15.000.
Ito, Toshiyasu; Minoura, Jun; Takahashi, Shigeyuki; Mori, Takaaki; Kato, Mamoru; and Funahashi, Toshikazu, 4,927,246, Cl. 350-357.000.
Tsutsui, Masatoshi, 4,927,683, Cl. 428-90.000.
Toyoda Gosei Co., Ltd: *See*—
Nishikawa, Masayuki; Miyazaki, Takeshi; Shigeki, Terumitsu; Mitzutani, Satoshi; and Isono, Toru, 4,927,190, Cl. 285-175.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Kato, Kichiro, 4,927,333, Cl. 417-316.000.
Matsumoto, Shinichi; Miyoshi, Naoto; Kimura, Mareo; Ozawa, Masakuni; and Isogai, Akio, 4,927,799, Cl. 502-303.000.
Nishikawa, Shoji; Ohkura, Akira; and Ichida, Katsuya, 4,926,958, Cl. 180-168.000.
Toyoyama, Kenji: *See*—
Otsuka, Tetsuji; Shinozaki, Kenichi; Toyoyama, Kenji; and Ishihara, Shinobu, 4,927,356, Cl. 431-351.000.
TransTechnology Corporation: *See*—
Westover, Dwight G., 4,927,132, Cl. 271-225.000.
Tremblay, Sylvain: *See*—
Ciloglu, Cavit; Gagne, Martin; Laraque, Edy; Poirier, Joel; Tremblay, Sylvain; and Trudel, Yves, 4,927,461, Cl. 75-254.000.
Treybig, Duane S., to Dow Chemical Company, The. Cured product from thermosettable prepolymer prepared from heterocyclic materials having alkyl substituents, mono- or dianhydrides, ethylenically unsaturated materials and a hydroxide, carbonate or bicarbonate of a metal of groups I-A or II-A. 4,927,913, Cl. 528-480.000.
Treybig, Duane S., to Dow Chemical Company, The. Reaction products of pyrimidine, pyridazine and 4-isopropenyl-1-cyclohexene-1-carboxaldehyde. 4,927,932, Cl. 544-357.000.
Triollier, Michel: *See*—
Leveque, Alain; and Triollier, Michel, 4,927,609, Cl. 423-21.500.

Troemel, Stephen T.: *See*—
Guerinot, William F.; Bradley, Ralph H.; and Troemel, Stephen T., 4,928,182, Cl. 358-245.000.
Trompler, Lyle D. Noise limiting circuit for earmuffs. 4,928,311, Cl. 381-72.000.
Trudel, Yves: *See*—
Ciloglu, Cavit; Gagne, Martin; Laraque, Edy; Poirier, Joel; Tremblay, Sylvain; and Trudel, Yves, 4,927,461, Cl. 75-254.000.
Trundle, Clive; and Brettle, Jack, to Plessey Overseas Limited. Marking of articles with photochromic compounds. 4,927,180, Cl. 283-70.000.
TRW Inc.: *See*—
Marum, John R., 4,928,022, Cl. 307-241.000.
TRW Repa GmbH: *See*—
Fohl, Artur, 4,927,175, Cl. 280-806.000.
Tsai, Allan. Pen-like eyeglass cleaner. 4,927,284, Cl. 401-195.000.
Tsai, Chong S.; Chen, Shou H.; Li, Bean T.; and Jean, King L., to Industrial Technology Research Institute. Process for applying electrically insulative layers. 4,927,664, Cl. 427-57.000.
Tsaklakidis, Christos: *See*—
Leinert, Herbert; Tsaklakidis, Christos; and Sponer, Gisbert, 4,927,834, Cl. 514-422.000.
Tsuboi, Masayoshi: *See*—
Kawata, Ken; Sato, Kozo; and Tsuboi, Masayoshi, 4,927,897, Cl. 526-240.000.
Tsuchida, Akiyoshi: *See*—
Rokutanda, Shuji; Higemitsu, Yasuo; Tsuchida, Akiyoshi; and Yamakoshi, Yukihiro, 4,927,734, Cl. 430-264.000.
Tsuchida, Yutaka: *See*—
Takahashi, Shuzo; Tsuchida, Yutaka; Osada, Shiro; Hasebe, Nobuhisa; and Nakada, Masayuki, 4,926,925, Cl. 164-154.000.
Tsuchihashi, Toshifumi: *See*—
Tamura, Mitsunobu; Tsuchihashi, Toshifumi; and Kenmochi, Toshihisa, 4,927,358, Cl. 432-204.000.
Tsuchiya Mfg. Co., Ltd.: *See*—
Morizumi, Mitsuo; Omura, Kinya; Arita, Eriya; Furuya, Katsuji; Yasuda, Sakae; and Kodera, Masaya, 4,926,914, Cl. 141-59.000.
Tsuji, Eiji: *See*—
Hakuta, Shinsaku; Yasaka, Yasuhiro; Nagura, Osamu; Tsuji, Eiji; Suzuki, Makoto; and Akagawa, Hirotaka, 4,926,541, Cl. 29-598.000.
Tsuji, Kazuo, to Sumitomo Electric Industries, Ltd. Diamond single crystal. 4,927,619, Cl. 423-446.000.
Tsujimura, Manabu: *See*—
Okumura, Katsuya; Kuriyama, Fumio; Murai, Yukio; Tsujimura, Manabu; and Sobukawa, Hiroshi, 4,926,648, Cl. 62-55.500.
Tsujimura, Osamu; Nakayama, Masaaki; and Okawa, Masayuki, to Mitsubishi Metal Corporation. Ball end mill. 4,927,303, Cl. 408-223.000.
Tsukazaki, Katsuhiko: *See*—
Ichihashi, Kouji; Tani, Junichi; Tsukazaki, Katsuhiko; Sakuyama, Hiroshi; Baba, Nobuo; Nakajima, Kiyoji; Arai, Takaaki; and Inaba, Akira, 4,926,906, Cl. 137-625.300.
Tsumura, Kenji; Yamada, Yukifumi; and Terada, Takami, to Daihatsu Motor Co., Ltd.; and Aishin Seiki Co., Ltd. Slide locking device for a car seat. 4,927,110, Cl. 248-430.000.
Tsunekawa, Tokuichi; Date, Nobuaki; Aizawa, Hiroshi; Hosoe, Kazuya; and Urushibara, Kazunori, to Canon Kabushiki Kaisha. Image recording system. 4,928,184, Cl. 358-335.000.
Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Yamamoto, Osamu; and Watanabe, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Radiographic diagnostic apparatus. 4,928,297, Cl. 378-146.000.
Tsutsui, Masatoshi, to Toyoda Gosei Co., Ltd. Color-bearing textile product. 4,927,683, Cl. 428-90.000.
Tuckey, Charles H., to Walbro Corporation. Pressure-responsive fuel delivery system. 4,926,829, Cl. 123-497.000.
Tufts, Timothy A., to Ashland Oil, Inc. Process for the preparation of a polyurethane from a storage stable polyol compositions. 4,927,862, Cl. 521-118.000.
Turley, Homer L.; Niksa, Marilyn J.; Pohto, Gerald R.; and Niksa, Andrew J., to ELTECH Systems Corporation. Bipolar metal/air battery. 4,927,717, Cl. 429-27.000.
Turpin, Marc: *See*—
Lefevre, Herve ; Bettini, Jean-Pierre; Botti, Serge; and Turpin, Marc, 4,928,005, Cl. 250-227.230.
Turrill, Frank H.: *See*—
Ward, Clifford; Chao, Eugene; Booth, Roy E.; Turrill, Frank H.; Wombles, Robert H.; Newman, John W.; and Hettinger, William P., Jr., 4,927,620, Cl. 423-447.200.
Tuszko, Wlodzimier J.; and Tuszko, Wojciech J. Cyclone separating method and apparatus. 4,927,298, Cl. 406-173.000.
Tuszko, Wojciech J.: *See*—
Tuszko, Wlodzimier J.; and Tuszko, Wojciech J., 4,927,298, Cl. 406-173.000.
Tuthill Corporation: *See*—
Gailey, Edward D., 4,926,895, Cl. 137-15.000.
Twenthieth Century Companies, Inc.: *See*—
Mikol, Erwin F., 4,927,191, Cl. 285-226.000.
Twentieth Century Companies, Inc.: *See*—
Mikol, Erwin F., 4,926,518, Cl. 15-104.330.
Twinpak Inc.: *See*—
Fattal, R. George; and Ringrose, Gordon, 4,927,486, Cl. 156-351.000.
Uarco Incorporated: *See*—
Ehret, Barbara A.; and Pearce, James H., III, 4,927,179, Cl. 283-79.000.
UAS Support, Inc.: *See*—
Snyder, Stephen J., 4,926,963, Cl. 181-290.000.
UBE Chemical Industries, LTD.: *See*—
Yamamoto, Kosei; Kaneyasu, Akira; and Iwamoto, Toshiichi, 4,927,611, Cl. 423-155.000.
Uchida, Naoto: *See*—
Yamaguchi, Shuichiro; Uchida, Naoto; Shimomura, Takeshi; and Oyama, Noboru, 4,927,516, Cl. 204-403.000.
Uchikubo, Akinobu: *See*—
Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Hasegawa, Jun; Sasaki, Masahiko; Sasagawa, Katsuyoshi; and Yamashita, Shinji, 4,928,172, Cl. 358-98.000.
Ueda, Chie: *See*—
Ueda, Iwao, 4,927,530, Cl. 210-149.000.
Ueda, Etsuko: *See*—
Ueda, Iwao, 4,927,530, Cl. 210-149.000.
Ueda, Hiroshi: *See*—
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Inoue, Manabu; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,928,124, Cl. 354-106.000.
Ueda, Iwao, to Ueda, Iwao; Ueda, Chie; and Ueda, Etsuko. Apparatus for processing sludge. 4,927,530, Cl. 210-149.000.
Ueda, Minoru: *See*—
Tanaka, Koji; Ueda, Minoru; and Masuda, Taizo, 4,927,710, Cl. 428-394.000.
Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Hasegawa, Jun; Sasaki, Masahiko; Sasagawa, Katsuyoshi; and Yamashita, Shinji, to Olympus Optical Co., Ltd. Endoscope output signal control device and endoscope apparatus making use of the same. 4,928,172, Cl. 358-98.000.
Uenaka, Kazushige: *See*—
Takase, Haruo; Uenaka, Kazushige; Abe, Akira; and Fujita, Yoshihiro, 4,927,533, Cl. 210-257.100.
Uesaki, Osamu. Ultra violet ray generator by means of microwave excitation. 4,928,040, Cl. 315-248.000.
Uesugi, Masaki: *See*—
Kaku, Nobuyuki; Shigemura, Tatsuya; Uesugi, Masaki; Kano, Kiyoshi; and Ogiro, Kenji, 4,928,191, Cl. 360-85.000.
Ullah, Ismat: *See*—
Bykadi, Gururaj; Kaplan, Murray A.; Corrao, Richard G.; Bara, Edward J.; Ullah, Ismat; and Agharkar, Shreeram N., 4,927,638, Cl. 424-455.000.
Ulrich, Helmut: *See*—
Fauck, Gerhard; Pohl, Wolfgang; and Ulrich, Helmut, 4,926,907, Cl. 137-627.500.
Umeno, Masayoshi; Sakai, Shiro; and Yahagi, Shinichiro, to Daido Tokushuko Kabushiki Kaisha; and Nagoya Institute of Technology. Epitaxial gallium arsenide semiconductor on silicon substrate with gallium phosphide and superlattice intermediate layers. 4,928,154, Cl. 357-16.000.
Ungchusri, Tep; and Lemons, George D., to FMC Corporation. Pipe connector load element. 4,927,192, Cl. 285-305.000.
Ungruh, Josef; and Rohlmann, Maximilian, to H. Niemeyer Sohne GmbH & Co. KG. Hay-making machine. 4,926,619, Cl. 56-15.400.
UniDynamics Corporation: *See*—
Falk, Leonard P.; and Griner, Paul K., 4,927,051, Cl. 221-12.000.
Unilever Patent Holdings, B.V.: *See*—
Bradshaw, Noel J.; and Hughes, David, 4,927,661, Cl. 426-641.000.
Union Carbide Chemicals and Plastics Company Inc.: *See*—
King, Roswell; E., III; Foster, George N.; and Petty, Herbert E., 4,927,898, Cl. 528-27.000.
Knopf, Robert J.; Theiling Jr., Louis F.; and Berti, Leroy P., 4,927,954, Cl. 558-441.000.
Wegman, Richard W., 4,927,967, Cl. 562-607.000.
Uniroyal Chemical Company, Inc.: *See*—
Brouwer, Walter G.; Felauer, Ethel Ellen; and Bell, Allyn Roy, 4,927,451, Cl. 71-92.000.
Uniroyal Chemical Ltd/Ltee: *See*—
Brouwer, Walter G.; Felauer, Ethel Ellen; and Bell, Allyn Roy, 4,927,451, Cl. 71-92.000.
Unistrut International Corp.: *See*—
Nehls, Charles O., 4,926,592, Cl. 52-98.000.
Unisys Corporation: *See*—
Protopapas, Dimitrios, 4,928,273, Cl. 370-85.700.
Unisys Corporation (Formerly Burroughs Corp): *See*—
Murphy, Patrick J.; and Svenkeson, John W., 4,927,370, Cl. 439-74.000.
Unit Instruments, Inc.: *See*—
Doyle, James H., 4,928,048, Cl. 318-644.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Banbury, John R.; and Barter, Derek L., 4,927,234, Cl. 350-174.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Trade and Industry in Her Brittanic Majesty's Government of the: *See*—
Westerlund, Nils G., 4,927,171, Cl. 280-718.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for United Kingdom Atomic Energy Authority in Her Britannic Majesty's Government of the: *See*—
Reading, Anthony H.; and Miles, Brynley J., 4,927,761, Cl. 435-178.000.
United States of America
Air Force: *See*—
Leger, Kenneth B., 4,927,994, Cl. 219-343.000.
May, Roger A., 4,928,258, Cl. 364-724.170.

Nash, Dudley O.; and Herzner, Frederick C., 4,926,633, Cl. 60-226.100.
Army: *See*—
Ferrett, Donald A., 4,927,771, Cl. 437-3.000.
Leupold, Herbert A., 4,928,081, Cl. 335-216.000.
Director, National Security Agency: *See*—
Beard, Warren T., Jr.; and Armstrong, Ronald W., 4,928,294, Cl. 378-74.000.
Energy: *See*—
Allen, Daniel T., 4,927,599, Cl. 376-321.000.
Birx, Daniel L.; and Reginato, Louis L., 4,928,020, Cl. 307-106.000.
Cioletti, Olinse C., 4,926,745, Cl. 92-256.000.
Johnson, Gerald D.; Lobsinger, Ralph J.; Hamilton, Margaret L.; and Gelles, David S., 4,927,468, Cl. 148-3.000.
Moyer, Bruce A.; and McDowell, W. J., 4,927,610, Cl. 423-24.000.
Petrovic, John J.; Carter, David H.; and Gac, Frank D., 4,927,792, Cl. 501-92.000.
Ross, Philip N., Jr., 4,927,718, Cl. 429-44.000.
Health and Human Services: *See*—
Chanock, Robert M.; Kapikian, Albert; Midthun, Karen; Flores, Jorge; Gorziglia, Mario; Hoshino, Yasutaka; and Peres-Schael, Irene, 4,927,628, Cl. 424-89.000.
National Aeronautics and Space Administration: *See*—
Crews, John H., Jr.; and Reeder, James R., 4,926,694, Cl. 73-794.000.
Deininger, William D.; and King, David Q., 4,928,027, Cl. 310-11.000.
von Pragenau, George L., 4,927,326, Cl. 415-170.100.
Navy: *See*—
Davey, John E.; and Christou, Aristos, 4,927,782, Cl. 437-184.000.
Kahn, Manfred, 4,928,264, Cl. 367-141.000.
Polly, Daniel R., 4,927,503, Cl. 204-153.110.
U.S. Philips Corp.: *See*—
Geertsma, Geert; Poel, Hendrik; and Weersink, Andreas, 4,926,550, Cl. 30-43.100.
Knibbe, Engel J., 4,928,180, Cl. 358-213.130.
Kroes, Anthony; and Van Engen, Pieter G., 4,927,217, Cl. 315-248.000.
Kuijk, Karel E., 4,927,241, Cl. 350-336.000.
Lock, Willem, 4,927,127, Cl. 269-322.000.
Theeten, Jean-Bernard; Autier, Philippe; and Auger, Jean Marc, 4,927,785, Cl. 437-225.000.
Van De Pas, Hermanus A., 4,927,228, Cl. 350-96.200.
Verhagen, Johannes P. C. M., 4,928,271, Cl. 369-292.000.
Wolfger, Arno, 4,926,551, Cl. 30-43.920.
Zegers, Antonius P. F., 4,927,218, Cl. 315-366.000.
Zieren, Victor; and Ruigrok, Jacobus J. M., 4,927,804, Cl. 505-1.000.
United Technologies: *See*—
Swindal, James L.; and Wiegand, Walter J., 4,928,263, Cl. 361-280.000.
United Technologies Corporation: *See*—
Blackburn, Martin J.; and Smith, Michael P., 4,927,458, Cl. 75-246.000.
Bluege, John, 4,927,790, Cl. 501-32.000.
Novotny, Rudolph J., 4,926,710, Cl. 74-573.00R.
Sanford, David L.; and Douglass, Gary W., 4,927,187, Cl. 285-80.000.
Stone, Robert A.; and Kish, Jules G., 4,926,991, Cl. 192-41.00S.
Wisner, George R., 4,927,249, Cl. 350-486.000.
Zabielski, Martin E., 4,927,350, Cl. 431-12.000.
United Technologies Electro Systems, Inc.: *See*—
Mayer, Ronald F.; and Thrasher, Robert, Jr., 4,927,203, Cl. 292-201.000.
Unitek Corporation: *See*—
Pospisil, Jirina V., 4,927,360, Cl. 433-8.000.
Snead, Wilford A., 4,927,362, Cl. 433-17.000.
Universite Paris X - Nanterre: *See*—
Herve, Philippe, 4,927,267, Cl. 356-336.000.
University of Bristol: *See*—
Frost, Martin; Horton, Bruce J.; and Tidd, Jonathan L., 4,926,603, Cl. 51-165.770.
University of California, The Regents of the: *See*—
Kramer, George C.; and Perron, Paul R., 4,927,806, Cl. 514-2.000.
Oppenheim, A. K.; Stewart, H. E.; and Hom, K., 4,926,818, Cl. 123-297.000.
University of Michigan, The Regents of the: *See*—
Townsend, Leroy B.; and Drach, John C., 4,927,830, Cl. 514-258.000.
University of Minnesota, Regents of the: *See*—
Dorman, Frank, 4,927,407, Cl. 600-16.000.
Ramalingam, Subbiah; and Frohrib, Darrell A., 4,927,299, Cl. 407-120.000.
Ramalingam, Subbiah; and Frohrib, Darrell A., 4,927,300, Cl. 407-120.000.
University of Rochester, The: *See*—
Bryant, Robert G.; and Listinsky, Jay J., 4,927,624, Cl. 424-9.000.
Mourou, Gerard A.; Nees, John A.; and Williamson, Steven L., 4,928,076, Cl. 330-4.300.
Williamson, Steven, 4,928,058, Cl. 324-96.000.
University of South Florida: *See*—
Kovacs, Stephen G., 4,927,410, Cl. 600-36.000.
Unterbusch, Manfred W.: *See*—
Stephens, Donald E.; and Unterbusch, Manfred W., 4,926,702, Cl. 73-864.830.
Unverferth Manufacturing Co., Inc.: *See*—
Van Mill, Michael D., 4,926,617, Cl. 53-587.000.
UOP: *See*—.
Cetinkaya, Ismail B.; and Culler, Robert P., 4,927,606, Cl. 422-144.000.
Coughlin, Peter K.; Mercer, William C.; and Flanigen, Edith M., 4,927,768, Cl. 436-172.000.
Kalnes, Tom N.; James, Robert B., Jr.; and Staggs, Darrell W., 4,927,520, Cl. 208-50.000.
St. Martin, Edward J., 4,927,760, Cl. 435-171.000.
Upmeier, Egon, to Kochs Adler Aktiengesellschaft. Automatic sewing device with a sewing head including a rotary housing. 4,926,769, Cl. 112-121.120.
Urabe, Hitoshi: *See*—
Tatsumi, Setsuji; Shiota, Kazuo; Urabe, Hitoshi; and Shimazaki, Osamu, 4,928,167, Cl. 358-80.000.
Urakami, Fukashi. Device capable of suction-adhering to a wall surface and moving therealong. 4,926,957, Cl. 180-164.000.
Urushibara, Kazunori: *See*—
Tsunekawa, Tokuichi; Date, Nobuaki; Aizawa, Hiroshi; Hosoe, Kazuya; and Urushibara, Kazunori, 4,928,184, Cl. 358-335.000.
Ushikubo, Takao; Iwasa, Yasuhiro; and Yamaji, Yukinori, to Sanken Electric Co., Ltd. Soldering method capable of providing a joint of reduced thermal resistance. 4,927,069, Cl. 228-123.000.
Usines et Acieries de Sambre et Meuse: *See*—
Haesebrouck, Francis, 4,926,761, Cl. 109-49.500.
UTDC Inc.: *See*—
Smith, Roy E.; and Timan, Peter E., 4,926,756, Cl. 105-167.000.
Utter, Robert E.: *See*—
Riffe, Delmar R.; Kotlarek, Peter A.; and Utter, Robert E., 4,927,339, Cl. 418-55.000.
Uyeda, Alan K.: *See*—
Gartner, Klaus W.; and Uyeda, Alan K., 4,926,664, Cl. 70-119.000.
Vachette: *See*—
Girard, Joel; and Wattebled, Christian, 4,927,196, Cl. 292-201.000.
Vaiskauckas, Gary A.: *See*—
Bealkowski, Richard; Dayan, Richard A.; Doria, David J.; Kinnear, Scott G.; Krantz, Jeffrey I.; Liverman, Robert B.; Sotomayor, Guy G.; Williams, Donald D.; and Vaiskauckas, Gary A., 4,928,237, Cl. 364-200.000.
Valev, Assen, to Steyr-Daimler-Puch. Oil-cooled internal combustion engine. 4,926,800, Cl. 123-41.420.
Valmet-Ahlstrom, Inc.: *See*—
Wikman, Kai, 4,927,499, Cl. 162-336.000.
Valvo, Russell. Floor care apparatus. 4,926,516, Cl. 15-49.00C.
Van Brust, Nicholas; Robertson, Jeffrey C.; and Homa, Daniel, to Eastman Kodak Company. Package for storing and remixing two materials. 4,927,013, Cl. 206-221.000.
Vance, Karen: *See*—
Kriauciunas, G. Vincent; and Vance, Karen, 4,927,427, Cl. 606-128.000.
van den Brink, Franciscus T. B.: *See*—
van Geem, Paul C.; and van den Brink, Franciscus T. B., 4,927,974, Cl. 568-357.000.
van den broek, Jos. Sewage sludge treatment system. 4,926,764, Cl. 110-221.000.
Van De Pas, Hermanus A., to U.S. Philips Corp. Optoelectronic arrangement having a coupling between an optical transmission fibre and a semiconductor laser diode. 4,927,228, Cl. 350-96.200.
van der Hoeven, Johannes C. W., to Hoechst Aktiengesellschaft. Method of making a decorative panel with improved surface characteristics. 4,927,572, Cl. 264-22.000.
Vanderlaan, Dirk, to Ibly Industries, Inc. Necked-down can having a false seam and an apparatus to form same. 4,927,043, Cl. 220-67.000.
Van Deventer, Bruce: *See*—
Huggins, Raymond W.; Van Deventer, Bruce; and Miller, Glen E., 4,928,008, Cl. 250-231.100.
Van Engen, Pieter G.: *See*—
Kroes, Anthony; and Van Engen, Pieter G., 4,927,217, Cl. 315-248.000.
van Gasse, Rene L. E., to DSM Resins B.V. Sheet moulding compound and a top for it. 4,927,701, Cl. 428-212.000.
van Geem, Paul C.; and van den Brink, Franciscus T. B., to Stamicarbon B.V. Process for the preparation of cyclohexanol and/or cyclohexanone. 4,927,974, Cl. 568-357.000.
Van Hees, Theodorus J.: *See*—
Smook, Jan; Vos, Gerardus J. H.; Juijn, Johannes A.; and Van Hees, Theodorus J., 4,927,586, Cl. 264-185.000.
Van Leeuwen, Hubert J.: *See*—
Saulnier, Kenneth D.; and Van Leeuwen, Hubert J., 4,927,395, Cl. 441-26.000.
Van Lommen, Guy R. E.: *See*—
Lutz, William R.; Verschueren, Wim G.; Fischer, Hanspeter; and Van Lommen, Guy R. E., 4,927,449, Cl. 71-90.000.
Van Mill, Michael D., to Unverferth Manufacturing Co., Inc. Apparatus for wrapping round bales. 4,926,617, Cl. 53-587.000.
van Opstal, Martin; Dewulf, Frans; Cleenewerck, Bernard; and Weber, Ernst, to N.V. Vandemoortele International. Process for the continuous removal of a gum phase from triglyceride oil. 4,927,544, Cl. 210-712.000.
Vanotti, Gerard, to Etablissements S.A. Device for elastically and rapidly fixing a railway rail. 4,927,078, Cl. 238-349.000.

Van Sloun, Peter H., to Honeywell Inc. Safety locking pull ring. 4,926,750, Cl. 102-261.000.

van Wingerden, Aart. Method and apparatus for propagating plants. 4,926,587, Cl. 47-85.000.

Varian Associates, Inc.: *See—*
Mears, Eric L.; and Jennings, Robert E., 4,927,438, Cl. 55-385.200.

Varo, Inc.: *See—*
Hart, Richard T., 4,927,237, Cl. 350-319.000.

Varshney, Sunil K.: *See—*
Teyssie, Philippe; Varshney, Sunil K.; Jerome, Robert; and Fayt, Roger, 4,927,703, Cl. 428-220.000.

Vartan-Boghossian, Razmik: *See—*
Coogan, Richard G.; and Vartan-Boghossian, Razmik, 4,927,876, Cl. 524-457.000.

Vatant, Robert: *See—*
Gay, Pierre; and Vatant, Robert, 4,926,930, Cl. 164-476.000.

Vaughan, Thomas L., to Signet Armorlite, Inc. Method and clamping device for bonding thin lens wafers. 4,927,480, Cl. 156-228.000.

VDO Adolf Schindling AG: *See—*
Porth, Wolfgang; Weibler, Wolfgang; Kern, Eckhart; Hannewald, Thomas; and Weingartner, Reiner, 4,926,821, Cl. 123-399.000.

Veerhusen, Dan S.; and Pattison, David C., to Rockwell International Corporation. Automatic fuel control and engine synchronizer system and apparatus. 4,926,628, Cl. 60-39.150.

VeloBind, Inc.: *See—*
Abildgaard, William H.; Chadwick, Charles; Hotkowski, Peter; and Todaro, Frank A., 4,927,310, Cl. 412-7.000.

Verhagen, Johannes P. C. M., to U.S. Philips Corporation. Holder for discs of different diameters. 4,928,271, Cl. 369-292.000.

Vermesse, Bernard, to Societe Anonyme dite : SMH Alcatel. Electronic franking machine including franking limit values. 4,928,244, Cl. 364-464.020.

Vermesse, Bernard, to Societe Anonyme dite : SMH Alcatel. Operating system for an electronic franking machine. 4,928,249, Cl. 364-518.000.

Verschueren, Wim G.: *See—*
Lutz, William R.; Verschueren, Wim G.; Fischer, Hanspeter; and Van Lommen, Guy R. E., 4,927,449, Cl. 71-90.000.

Vetrotex Saint-Gobain: *See—*
Soszka, Barbara; Federowsky, Robert; and Mahler, Jacques, 4,927,445, Cl. 65-11.100.

Vexcel Corp.: *See—*
Leberl, Franz W.; Karspeck, Milan; Johns, Bryan; and Lee, Scott, 4,928,169, Cl. 358-93.000.

Vicari, Richard; Aslam, Mohammad; Ray, Wilson B.; Davenport, Kenneth G.; Dammel, Ralph; Lingnau, Juergen; and Doessel, Karl-Friedrich, to Hoechst Celanese Corporation. 3,5-disubstituted-4-acetoxystyrene and process for its production. 4,927,956, Cl. 560-130.000.

Victoria University of Manchester, The: *See—*
Bruce, John M., 4,927,845, Cl. 514-440.000.

Vidal, Hugues: *See—*
Barlou, Andre ; Beltritti, Alexandre; Gramondi, Patrick; and Vidal, Hugues, 4,927,564, Cl. 252-628.000.

Vigander, Svein: *See—*
Schohl, Gerald A.; and Vigander, Svein, 4,926,675, Cl. 73-19.000.

Villaine, Philippe: *See—*
Gouttebessis, Jacques; and Villaine, Philippe, 4,926,920, Cl. 152-548.000.

Villard, Alexandre; and Cotonea, Yves, to Societe Chimique des Charbonnages S.A. Process of producing concentrated solutions of ammonium nitrate. 4,927,617, Cl. 423-396.000.

Vinegar, Harold J.: *See—*
Glandt, Carlos A.; Vinegar, Harold J.; and Prats, Michael, 4,926,941, Cl. 166-248.000.

Vinson, John R.: *See—*
Diaz, Stephen H.; Cherian, Gabe; Morris, Stephen; Vinson, John R.; Crofts, David; and Moore, Anthony J., 4,928,199, Cl. 361-56.000.

Viscount Industries Limited: *See—*
McNab, Wayne, 4,927,039, Cl. 220-3.700.

Visic, Inc.: *See—*
Abbott, Robert A.; Barbara, Bruce; and Roy, Richard S., 4,928,266, Cl. 365-189.010.

Visualtek, Inc.: *See—*
Soloveychik, Yakov G.; and Israel, Larry, 4,928,170, Cl. 358-94.000.

Vitsky, Sally J.; and Levine-Umans, Margaret P. Knockdown furniture. 4,926,759, Cl. 108-111.000.

Vivat, Michel; and Buendia, Jean, to Roussel Uclaf. Novel 23-keto-steroids. 4,927,921, Cl. 540-110.000.

Vo, Tri T., to NCR Corporation. Circuit for stable synchronization of asynchronous data. 4,928,290, Cl. 375-118.000.

Vocke, Henning L.; and Saarenko, Pauli, to Oy Alu AB. Cooking vessel. 4,926,843, Cl. 126-390.000.

Voest-Alpine Maschinenbau Gesellschaft m.b.H.: *See—*
Durchschlag, Gerald; Lang, Alfred; Rotter, Franz; Fritz, Dieter; and Kopilovitsch, Heinz, 4,927,102, Cl. 246-469.000.

Vogenthaler, James R.: *See—*
Duback, David W.; and Vogenthaler, James R., 4,928,205, Cl. 361-346.000.

Voisine, Gary R., to Emhart Industries, Inc. Pusher mechanism for glass forming machine. 4,927,444, Cl. 65-323.000.

Volkswagen AG: *See—*
Dahlmann, Gerd-Uwe, 4,926,824, Cl. 123-450.000.

Volpe, Fulvio; and Perchiazzi, Michele, to Selenia Industrie Elettroniche Associate S.p.A. Housing and connection device for electronic modules. 4,928,208, Cl. 361-395.000.

Von Roll Transportsysteme AG: *See—*
Feuz, Fritz, 4,926,754, Cl. 104-112.000.

von Entress-Fursteneck, Wolfgang: *See—*
Wittman, Jurgen; von Entress-Fursteneck, Wolfgang; and Thurner, Gunther, 4,926,751, Cl. 102-348.000.

von Pragenau, George L., to United States of America, National Aeronautics and Space Administration. Turbomachinery rotor support with damping. 4,927,326, Cl. 415-170.100.

Vornado Air Circulation Systems, Inc.: *See—*
Coup, Michael C.; Israel, Gary P.; Ediger, Glen W.; and Moore, Donald J., 4,927,324, Cl. 415-121.200.

Vos, Gerardus J. H.: *See—*
Smook, Jan; Vos, Gerardus J. H.; Juijn, Johannes A.; and Van Hees, Theodorus J., 4,927,586, Cl. 264-185.000.

Vriezen, John J.; and Niemeyer, Robin N., to International Business Machines Corporation. Enhanced semaphore architecture. 4,928,222, Cl. 364-200.000.

VT-Verpackungstechnik Zurich: *See—*
Egger, Walter C., 4,926,971, Cl. 184-15.100.

Vuillet, Alain E., to Aerospatiale Societe Nationale Industrielle. Blade for high-performance shrouded propeller, multi-blade shrouded propeller provided with such blades and tail rotor arrangement with shrouded propeller for rotary wing aircraft. 4,927,331, Cl. 416-238.000.

Vyas, Dolatrai M.; Doyle, Terrence W.; and Partyka, Richard A., to Bristol-Myers Company. Substituted 7-oxomitosanes. 4,927,943, Cl. 548-422.000.

W. M. Still & Sons Limited: *See—*
Snowball, Malcolm R.; and Hayes, Cecil, 4,927,060, Cl. 222-146.500.

W. R. Grace & Co.-Conn.: *See—*
Bekele, Solomon, 4,927,691, Cl. 428-35.200.
Herran, Vincent W.; and Wofford, George D., 4,927,708, Cl. 428-332.000.

W. R. Grace Limited: *See—*
Cusdin, George B., 4,927,723, Cl. 430-15.000.

WABCO Westinghouse Fahrzeugbremsen GmbH: *See—*
Fauck, Gerhard; Pohl, Wolfgang; and Ulrich, Helmut, 4,926,907, Cl. 137-627.500.

Wachholz, E. Petyr: *See—*
Roth, Scott S.; Nguyen, Bich-Yen; Tobin, Philip J.; Ray, Wayne; Wachholz, E. Petyr; and Wissen, Glenn, 4,927,780, Cl. 437-69.000.

Wachtersbacher Keramik Otto Friedrich Furst zu Ysenburg und Budingen GmbH & Co. KG: *See—*
Nawothnig, Klaus, 4,927,671, Cl. 427-274.000.

Wacoal Corp.: *See—*
Miyamura, Tetsuo, 4,926,502, Cl. 2-44.000.

Wada, Katsuo: *See—*
Iwai, Kazumi; Koizumi, Hiromi; and Wada, Katsuo, 4,926,645, Cl. 60-723.000.

Wada, Kou: *See—*
Saito, Kenichi; Wada, Kou; and Yoshizawa, Masahiro, 4,928,010, Cl. 250-310.000.

Wada, Masahiro: *See—*
Tanaka, Toshiyuki; Kuga, Shigeki; Nakamura, Nobuo; Morishita, Taro; and Wada, Masahiro, 4,928,236, Cl. 364-513.000.

Wada, Shunichi, to Mitsubishi Denki Kabushiki Kaisha. Suspension control apparatus for an automotive vehicle. 4,927,170, Cl. 280-707.000.

Wada, Sumio: *See—*
Ichinomiya, Tsutomu; Kami, Tomohiro; Kitagawa, Fumio; Wada, Sumio; Abe, Hideaki; Ise, Youichi; and Kusunoki, Toshio, 4,926,881, Cl. 128-804.000.

Wade, William D., to Lockheed Missiles & Space Company, Inc. Radio-frequency reflective fabric. 4,926,910, Cl. 139-425.00R.

Wadhwa, Lachhman; Bitritto, Michel; and Powers, Edward J., to Hoechst Celanese Corp. Fabrication of high performance polybenzimidazole films. 4,927,909, Cl. 528-331.000.

Wadley Technologies, Inc.: *See—*
Dorn, Gordon L.; and Johnson, Michael A., 4,927,605, Cl. 422-102.000.

Wagi, Susumu: *See—*
Kasahara, Nobuo; and Wagi, Susumu, 4,928,144, Cl. 355-245.000.

Wagner, Frederick W.; de la Motte, Rebecca S.; and Dean, Maria A., to Nebraska Department of Economic Development, State of Nebraska, U.S.A. Sugar ester synthesis. 4,927,920, Cl. 536-119.000.

Wagner, James L., to Notron Engineering AG. Interlock latch assembly for releasably securing cowl sections of an outboard motor. 4,927,194, Cl. 292-128.000.

Wagner, Joseph M., to C & C Incorporated. Convertible top vinyl push-out. 4,927,202, Cl. 296-107.000.

Waibel, Terry J.: *See—*
Hopkins, William M.; Brightwell, Robert A.; Young, Ray A.; Clark, John K.; Miller, Frederick W.; Galante, Richard L.; Waibel, Terry J.; and Kolowski, Michael A., 4,926,919, Cl. 152-209.00R.

Waidelich, Wilhelm: *See—*
Schmidt, Karl-Heinz; and Waidelich, Wilhelm, 4,928,176, Cl. 358-126.000.

Wakahara, Katsuhiro: *See—*
Masuda, Masaaki; Kotani, Masanori; Wakahara, Katsuhiro; and Sakata, Shuichi, 4,926,653, Cl. 62-204.000.

Wakaiki, Akinori: *See*—
Shimada, Shinichi; Kawaguchi, Noboru; Koyama, Tadayoshi; Wakaiki, Akinori; Hayashi, Keiji; Takeshita, Yasuyoshi; Nakakoshi, Masamichi; and Kawanishi, Gosei, 4,927,959, Cl. 560-193.000.

Wakamoto, Katsuyoshi: *See*—
Kusakawa, Takaji; Wakamoto, Katsuyoshi; and Imaizumi, Mitsuyuki, 4,927,467, Cl. 148-3.000.

Wakley, William D.: *See*—
Worrell, J. Robert; Wakley, William D.; and Young, Grant A., 4,927,536, Cl. 210-512.200.

Walberg, Per-Erik: *See*—
Bartlett, Kenneth G.; and Walberg, Per-Erik, 4,928,192, Cl. 360-77.080.

Walbro Corporation: *See*—
Tuckey, Charles H., 4,926,829, Cl. 123-497.000.

Waldner, Kurt. Die apparatus. 4,926,677, Cl. 72-430.000.

Walkden, Stephen A., to Hercules Incorporated. Sizing pulp. 4,927,496, Cl. 162-136.000.

Walker, Jimmy P.; and Barton, James T., to Eastman Kodak Company. Mount for linear assembly. 4,928,119, Cl. 346-108.000.

Walker, Jimmy P.: *See*—
Barton, James T.; and Walker, Jimmy P., 4,928,139, Cl. 355-1.000.

Walker, Keith A. M.; and Kertesz, Denis J., to Syntex (U.S.A.) Inc. Novel processes for the synthesis of certain bicyclo(4.2.0)octane derivatives with valuable therapeutic properties. 4,927,963, Cl. 562-501.000.

Wall, Monika: *See*—
Tomforde, Johann; and Wall, Monika, 4,927,106, Cl. 248-146.000.

Wallhillich, Guenter; Bleckmann, Gerhard; and Scholz, Dankmar, to BASF Aktiengesellschaft. Closing and/or sealing orifices, cavities or spaces in printing plates mounted on plate cylinders. 4,927,740, Cl. 430-309.000.

Walls, John E.; Tellechea, Carlos; and Dhillon, Major S., to Hoechst Celanese Corporation. Radiation polymerizable composition and element containing a photopolymerizable acrylic monomer. 4,927,737, Cl. 430-278.000.

Walsh, James W. Precision micro-liter drop dispenser. 4,927,062, Cl. 222-420.000.

Waltenburg, Harold D. Fluid supply line flow control device. 4,926,901, Cl. 137-456.000.

Walter, Manfred: *See*—
Weber, Heinz; Nintz, Eckhard; Walter, Manfred; Ballweber, Dieter; and Ottermayer, Bertram, 4,927,859, Cl. 521-59.000.

Walters, James M., III: *See*—
McKenna, Peter L.; and Walters, James M., III, 4,927,258, Cl. 351-156.000.

Walton, Derek N.; and Hoppe, Richard J., to Sundstrand Corporation. Power supply with integral filter and cooling device. 4,928,138, Cl. 363-40.000.

Walton, Robert L., to Willett International Limited. Method for operating a valve. 4,928,111, Cl. 346-1.100.

Wandrey, Christian: *See*—
Memmert, Klaus; and Wandrey, Christian, 4,927,751, Cl. 435-3.000.

Wang, Grande. Sanitary lavatory seat system. 4,926,506, Cl. 4-247.000.

Wang, I-Chung W.: *See*—
DeRudder, James L.; Savenije, Herman; and Wang, I-Chung W., 4,927,880, Cl. 525-63.000.

Wang, Jui-Shang, to Duracraft Corporation. Portable electrical fan. 4,927,120, Cl. 248-676.000.

Wang, Jui-Shang, to Duracraft Corporation. Portable electrical appliance. 4,928,204, Cl. 361-331.000.

Wang, Moon-Yee: *See*—
Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, 4,928,260, Cl. 365-49.000.

Wang, Patrick S.; Strobl, Georg; and Chu, Raymond W. H., to Johnson Electric Industrial Manufactory, Limited. Electrical connector. 4,927,379, Cl. 439-398.000.

Wang, Pen C., to Shell Oil Company. Novel polyamideimide polymers. 4,927,906, Cl. 528-228.000.

Wang, Pen C., to Shell Oil Company. Curable resin composition comprising cyanato aryl spirodilactam. 4,927,908, Cl. 528-323.000.

Wang, Wei. Utility tools. 4,926,522, Cl. 16-114.00R.

Waragai, Kenichi: *See*—
Gotoh, Masao; Hira, Yasuo; Waragai, Kenichi; Nakamura, Shozo; and Yokono, Hitoshi, 4,927,044, Cl. 220-83.000.

Ward, Clifford; Chao, Eugene; Booth, Roy E.; Turrill, Frank H.; Wombles, Robert H.; Newman, John W.; and Hettinger, William P., Jr., to Ashland Oil, Inc. Process for the manufacture of carbon fibers and feedstock therefor. 4,927,620, Cl. 423-447.200.

Ward, Robert E., Jr., to Warner & Swasey Company, The. Linear bearing with improved lubrication system and method. 4,927,272, Cl. 384-13.000.

Ward, Rodney L.: *See*—
Kaiser, Thomas A.; Mulder, Douglas C.; O'Ryan, David E.; Schneider, Douglas A.; and Ward, Rodney L., 4,927,346, Cl. 425-81.100.

Wareing, James R.: *See*—
Damon, Robert E., II; and Wareing, James R., 4,927,851, Cl. 514-460.000.

Warkentin, David J.: *See*—
Haritonidis, Joseph H.; Senturia, Stephen D.; Warkentin, David J.; and Mehregany, Mehran, 4,926,696, Cl. 73-205.000.

Warner-Lambert Company: *See*—
Ghebre-Sellassie, Isaac; Gordon, Robert H.; and Khan, Sadath U., 4,927,639, Cl. 424-497.000.

Warner & Swasey Company, The: *See*—
Ward, Robert E., Jr., 4,927,272, Cl. 384-13.000.

Wasco Products, Inc.: *See*—
Sampson, Robert; and Flanigan, Sean, 4,926,594, Cl. 52-200.000.

Waste Management, Inc.: *See*—
Acosta, Wilfred J., 4,927,317, Cl. 414-724.000.

Watanabe, Atsuhi: *See*—
Kuroda, Hiroshi; and Watanabe, Atsuhi, 4,928,107, Cl. 342-357.000.

Watanabe, Hiroshi: *See*—
Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Yamamoto, Osamu; and Watanabe, Hiroshi, 4,928,297, Cl. 378-146.000.

Watanabe, Kiminori: *See*—
Nakagawa, Akio; Ohashi, Hironichi; Yamaguchi, Yoshihiro; Watanabe, Kiminori; and Thukakoshi, Thuneo, 4,928,155, Cl. 357-23.400.

Watanabe, Nobuhiro: *See*—
Hori, Saburo; and Watanabe, Nobuhiro, 4,927,793, Cl. 501-134.000.

Watanabe, Yoichiro: *See*—
Isoda, Tetsuo; Watanabe, Yoichiro; Nakayama, Nobuhiro; and Aoki, Mitsuo, 4,927,728, Cl. 430-108.000.

Watanabe, Yoshio: *See*—
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Wessling, Ritchie A.; Whipple, Sharon S.; and Fibiger, Richard F., to Dow Chemical Company, The. Ionic complex for enhancing performance of water treatment membranes. 4,927,540, Cl. 210-638.000.
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Iyer, Natraj C.; Carr, Walter J., Jr.; and Male, Alan T., 4,927,985, Cl. 174-125.100.
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Whipple, Sharon S.: *See*—
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White, Alan V., to Compaq Computer Inc. Switching mode DC-to-DC power supply with improved current sensing. 4,928,220, Cl. 363-56.000.
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Wieland, Rolf H.; and Krongold, Martin A., to MG Industries. Apparatus for removing gas from a liquid. 4,927,433, Cl. 55-18.000.
Wight, Donald C.; and Krueger, Keith T., to Siemens Energy & Automation, Inc. Wire channel bushing and electrical enclosures coupled therewith. 4,927,982, Cl. 174-50.000.
Wight, Mark S.: *See*—
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Wilkins, John D. Storage container and fastener assembly for cars. 4,927,200, Cl. 296-37.800.
Wilkinson, William H.: *See*—
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Wilkinson, William T. Storage device for personal dental hygiene and oral care products. 4,927,011, Cl. 206-217.000.
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Williams, Bruce T. High speed D.C. non-contacting electrostatic voltage follower. 4,928,057, Cl. 324-72.000.
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Wilson, Craig A.: *See*—
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Wilson, Donald G. Water shedding device for boat covers. 4,927,109, Cl. 248-354.300.
Wilson, James A., to Doulbe-E Inc. Blowout preventer. 4,927,112, Cl. 251-1.300.
Wilson, John D., to Corstor (Proprietary) Limited. Core trays. 4,927,022, Cl. 206-443.000.
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Worner, Siegfried; Zacke, Peter; and Wirth, Georg, to J. Eberspacher. Device for catalytic cleaning of motor vehicle exhaust gases. 4,927,608, Cl. 422-179.000.

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Wright, William E.; Davis, Bryan T.; Matteson, Donald S.; and Knapp, Gordon G., to Ethyl Corporation. Haze-free boronated antioxidant. 4,927,553, Cl. 252-49.600.

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Yagi, Nobuyuki; Inagaki, Jiro; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, to Teikoku Tsushin Kogyo Co., Ltd. Molded resin casing of electronic part with flexible flat cable. 4,928,082, Cl. 338-174.000.

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Yajima, Hiroshi, to Casio Computer Co., Ltd. Manually scanning apparatus with straightening rollers. 4,928,183, Cl. 358-296.000.

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Yamada, Shinjiro, to Mitsui Kinzoku Kogyo Kabushiki Kaisha. Actuator for automotive door locking device. 4,926,707, Cl. 74-96.000.

Yamada, Takanobu, to Minolta Camera Co., Ltd. Developing device. 4,928,146, Cl. 355-253.000.

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Tsumura, Kenji; Yamada, Yukifumi; and Terada, Takaaki, 4,927,110, Cl. 248-430.000.

Yamagishi, Takanori; Idai, Tsutomu; and Takahashi, Eiji, to Maruzen Petrochemical Co., Ltd. Process for the preparation of p-ethylphenol. 4,927,979, Cl. 568-791.000.

Yamaguchi, Mikio; Suzuki, Chiharu; Matsunari, Kenji; Miyazawa, Takeshige; and Nakamura, Yasuo, to Kumiai Chemical Industry Co., Ltd.; and Ihara Chemical Industry Co., Ltd. Thiadiazabicyclononane derivatives and herbicidal compositions. 4,927,448, Cl. 71-90.000.

Yamaguchi, Sataro, to Mitsubishi Denki Kabushiki Kaisha. Reversed field pinch apparatus. 4,927,592, Cl. 376-123.000.

Yamaguchi, Shuichiro; Uchida, Naoto; Shimomura, Takeshi; and Oyama, Noboru, to Terumo Kabushiki Kaisha. Enzyme sensor. 4,927,516, Cl. 204-403.000.

Yamaguchi, Yoshihiro: *See*—
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Yamaji, Yukinori: *See*—
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Yamakoshi, Yukihiro: *See*—
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Yamamoto, Hajime; Takashima, Yuji; Kitagaki, Kazunori; and Nakamura, Masahiko, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for color electrophotography. 4,927,724, Cl. 430-45.000.
Yamamoto, Hideo; Sato, Takeshi; Yoshimi, Toshikazu; Mori, Shuichi; and Tokumo, Akio, to Pioneer Electronic Corporation. Limiter circuit. 4,928,071, Cl. 330-129.000.
Yamamoto, Hiroaki: *See*—
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Higuchi, Mitsuhiro; Yamamoto, Hirofumi; Yamamoto, Osamu; Fujii, Shokichi; and Nonomura, Katsumi, 4,926,505, Cl. 4-247.000.
Yamamoto, Kazuki: *See*—
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Yamamoto, Kosei; Kaneyasu, Akira; and Iwamoto, Toshiichi, to UBE Chemical Industries, LTD. Lightweight magnesia clinker and process for the preparation of the same. 4,927,611, Cl. 423-155.000.
Yamamoto, Osamu: *See*—
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Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Yamamoto, Osamu; and Watanabe, Hiroshi, 4,928,297, Cl. 378-146.000.
Yamamoto, Yoshikazu. Domestic pets' chamberpot. 4,926,794, Cl. 119-1.000.
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Yamamuro, Takahiko, to Mitsubishi Denki Kabushiki Kaisha. Picture display device. 4,928,173, Cl. 358-102.000.
Yamanaka, Hiromichi: *See*—
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Yamashita, Norihisa: *See*—
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Yang, Herbert; Han, Patrick; and Yu, Frank. Disposable covered needle safety assembly. 4,927,018, Cl. 206-365.000.
Yang, Ming-he; Chen, Yan-rong; Liu, Geng-tao; and Huang, Liang, to Chinese Academy of Medical Science; and Bayer Aktiengesellschaft. Pharmacologically active ϵ-valerolactams. 4,927,937, Cl. 546-296.000.
Yano, Shunji, to Honda Giken Kogyo Kabushiki Kaisha. Variable-displacement turbine. 4,927,325, Cl. 415-161.000.
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Yazaki Corporation: *See*—
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Yeager, Gregory H. Raft inflation valve. 4,927,397, Cl. 441-41.000.
Yeamans, Robert C. Roof deck covering system. 4,926,596, Cl. 52-408.000.
Yeda Research and Development Co., Ltd.: *See*—
Krongauz, Valeri A.; and Shvartsman, Felix P., 4,927,917, Cl. 534-567.000.
Yerkes, James E.; and Lethen, Theodore H., to Bethlehem Steel Corporation. Method and apparatus for monitoring the thickness profile of a strip. 4,928,257, Cl. 364-563.000.
Ylvisaker, Jon A., to Borden, Inc. Method of preparing popcorn. 4,927,648, Cl. 426-234.000.
Yokohama Rubber Co., Ltd., The: *See*—
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Zabielski, Martin E., to United Technologies Corporation. Combustion control. 4,927,350, Cl. 431-12.000.
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Zielke, Darrell W.; and Dean, Kenneth D., to Paktec Automation. Cassette packaging system. 4,926,616, Cl. 53-585.000.
Zieren, Victor; and Ruigrok, Jacobus J. M., to U.S. Philips Corp. Thin-film transformer and magnetic head provided with such a transformer. 4,927,804, Cl. 505-1.000.
Zijsling, Djurre H., to Shell Oil Company. Method for monitoring the wear of a rotary type drill bit. 4,926,950, Cl. 175-39.000.
Zilberman, Moshe; Livne, Mordechai; Tchetchick, Doron; and Daniel, Moshe, to Israel Aircraft Industries, Ltd. Apparatus for dissipating shock-wave energy experienced by a test model. 4,926,684, Cl. 73-147.000.
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Zimmermann, Bernd D.; Claus, Richard O.; and Murphy, Kent A., to Center for Innovative Technology. Method and apparatus for sensing strain. 4,928,004, Cl. 250-227.140.
Zoboli, Walter. Dielectric joint, particularly for metallic conduits for liquids and/gases. 4,927,186, Cl. 285-54.000.
Zoltai, Tibor: *See*—
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Zulian, Ferruccio, to Bull HN Information Systems Italia S.p.A. Multiprocessor system featuring global data multiplation. 4,928,224, Cl. 364-200.000.
Zupancic, Anton Z.; and Deucher, Joseph S., to Picker International, Inc. Gantry tilt and support assembly for CT scanner. 4,928,292, Cl. 378-17.000.
501 Daido Metal Company Ltd.: *See*—
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501 Kabushiki Kaisha Hayashibara Kagaku Kenkyujo: *See*—
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501 Microphoretic Systems, Inc.: *See*—
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LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF MAY, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Dental Association Health Foundation: *See*—
Brown, Walter E.; and Chow, Laurence C., Re. 33,221, Cl. 423-308.000.

Brown, Walter E.; and Chow, Laurence C., to American Dental Association Health Foundation. Dental restorative cement pastes. Re. 33,221, Cl. 423-308.000.

Chow, Laurence C.: *See*—
Brown, Walter E.; and Chow, Laurence C., Re. 33,221, Cl. 423-308.000.

Collier, William R., to Interstitial Systems, Inc. Modular combination floor support and electrical isolation system for use in building structures. Re. 33,220, Cl. 52-263.000.

Daniell, Michael G.; and Martin, Gerald S., to Fisher & Paykel Limited. Clamp valves. Re. 33,219, Cl. 251-7.000.

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Daniell, Michael G.; and Martin, Gerald S., Re. 33,219, Cl. 251-7.000.

Interstitial Systems, Inc.: *See*—
Collier, William R., Re. 33,220, Cl. 52-263.000.

Martin, Gerald S.: *See*—
Daniell, Michael G.; and Martin, Gerald S., Re. 33,219, Cl. 251-7.000.

Twardosz, Brian. Weight lifting bar. Re. 33,218, Cl. 272-123.000.

LIST OF DESIGN PATENTEES

Aderman, Wayne L.; Garmon, Vincent S.; Rodd, Timothy J.; and Tennant, Robert P., to International Business Machines Corp. Data processor. 308,047, 5-22-90, Cl. D14-100.000.

Aiken, Keith R. Combined vehicle bumper and guard. 308,037, 5-22-90, Cl. D12-169.000.

Akagi, Kenichi: *See*—
Tedham, Thomas A.; and Akagi, Kenichi, 308,055, Cl. D14-114.000.

Alberta, Terry D., to Pro-Tec Sports International, Inc. Bicycle exerciser. 308,085, 5-22-90, Cl. D21-194.000.

Alfa Lancia Industriale S.p.A.: *See*—
Vitale, Carmelo; and Villa, Ezio, 308,115, Cl. D26-122.000.

Amemiya, Masatomo, to Janome Sewing Machine Co. Ltd. Slide plate of a sewing machine. 308,063, 5-22-90, Cl. D15-72.000.

Amerock Corporation: *See*—
Gresens, Stanley T.; and Green, A. Denton, 307,992, Cl. D6-523.000.

Andou, Takaharu: *See*—
Sugano, Yoshihiko; and Andou, Takaharu, 308,050, Cl. D14-106.000.

Apple Computer, Inc.: *See*—
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Peart, Stephen, 308,054, Cl. D14-113.000.

Associated Mills Inc.: *See*—
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, 308,092, Cl. D23-209.000.

Astley, Graham J.; and Turner, Barry S., to Belanger, Inc. Vehicle air drying nozzle. 308,123, 5-22-90, Cl. D32-4.000.

Badgett, James L., to Conair Corporation. Hot lather machine. 308,117, 5-22-90, Cl. D28-9.000.

Banathy, Eugene D.; Davis, Augustus B.; and Carlson, David A., to Intermatic Electronics, Incorporated. Outdoor light fixture. 308,111, 5-22-90, Cl. D26-68.000.

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Bishop, Keith A.; and Blake, William S., to Schering Corporation. Nasal spray pump. 308,100, 5-22-90, Cl. D24-62.000.

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Brown, John M. Illuminated menu display unit. 308,079, 5-22-90, Cl. D20-20.000.

Buffey, Peter D. Golf practice mat. 308,087, 5-22-90, Cl. D21-234.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Earring. 308,027, 5-22-90, Cl. D11-43.000.

Bustos, Rafael T., to Leggett & Platt, Incorporated. Beverage display stand. 307,987, 5-22-90, Cl. D6-450.000.

Butler, Gerald L. Aircraft. 308,043, 5-22-90, Cl. D12-342.000.

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Westphal, Dennis; and Piles, Jonathan, 308,103, Cl. D25-124.000.

Chandler, Bill B. Transformer housing. 308,044, 5-22-90, Cl. D13-110.000.

Choi, Hoi, to Sklar-Peppler Inc. Seat. 307,983, 5-22-90, Cl. D6-334.000.

Chuo Kagaku Kabushiki Kaisha: *See*—
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Collins, John A., Jr. Orthodontic face mask. 308,096, 5-22-90, Cl. D24-10.000.

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Cornell, Wallace. Exterior shell of a camper kitchen trailer body. 308,033, 5-22-90, Cl. D12-102.000.

Costello, James J. J.; and Prindle, William A., to Igloo Products Corporation. Portable insulated chest. 307,998, 5-22-90, Cl. D7-605.000.

Counts, Richard C.; and Fiegenschue, David, to Prescolite Inc. Combined face plate and control operators for an electrical switch or similar articles. 308,045, 5-22-90, Cl. D13-170.000.

Culler, Randy, to Sklar-Peppler Inc. Seat. 307,984, 5-22-90, Cl. D6-334.000.

Dallal, Fred H.; and Glaser, Milton, to Media Holdings, Inc. Advertising sign adapted for installation at a check-out counter. 308,078, 5-22-90, Cl. D20-10.000.

Dallape, Donald A. Automobile storage bag. 307,978, 5-22-90, Cl. D3-40.000.

Darden, Julius C.; Praca, Miguel M. L.; and Tomasi, Philip J. Lockable and removable slidein assembly for a hard disk drive. 308,052, 5-22-90, Cl. D14-109.000.

Davidson, Grant M. N., to U.S. Philips Corporation. Remote control for a car radio receiver. 308,060, 5-22-90, Cl. D14-218.000.

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De Luca, Paul V., to Porta Systems Corp. Telephone main frame module or similar article. 308,061, 5-22-90, Cl. D14-240.000.
DeMars, Robert A. Tumbler with a swizzle stick holder. 307,996, 5-22-90, Cl. D7-507.000.
Dennett, Carol J. Handheld reference computer. 308,049, 5-22-90, Cl. D14-100.000.
Desbarats, Gus E., to British Telecommunications public limited company. Telephone base unit. 308,059, 5-22-90, Cl. D14-151.000.
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Disera, William P. Woodwind mouthpiece. 308,069, 5-22-90, Cl. D17-13.000.
Dohrmann, Edward. Pan or the like for pouring liquids into a drum. 308,002, 5-22-90, Cl. D7-700.000.
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Ellis, Reginald C. L. Traction mat for attachment to a vehicle tire. 308,039, 5-22-90, Cl. D12-154.000.
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Falero, Avelino. Automobile. 308,031, 5-22-90, Cl. D12-91.000.
Falk, Martin L. Display cabinet. 307,986, 5-22-90, Cl. D6-440.000.
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Freeman, Danny G. Flexible vehicle-like child's toy. 308,083, 5-22-90, Cl. D21-124.000.
Fujioka, Akio, to Kitagawa Industries Co., Ltd. Clamp for clamping wires. 308,017, 5-22-90, Cl. D8-396.000.
Funk, Robert R. Stemware rack. 307,990, 5-22-90, Cl. D6-513.000.
Gamble, Robert Mc. Golf tee. 308,086, 5-22-90, Cl. D21-208.000.
Garmon, Vincent S.: *See—*
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Gecchelin, Bruno, to Fratelli Guzzini S.p.A. Holder for writing instruments. 308,076, 5-22-90, Cl. D19-85.000.
Gecchelin, Bruno, to Fratelli Guzzini S.p.A. Paper holder. 308,077, 5-22-90, Cl. D19-90.000.
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, to Associated Mills Inc. Faucet filter. 308,092, 5-22-90, Cl. D23-209.000.
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Guidry, Warren L., to Interco Tire Corporation. Tire. 308,038, 5-22-90, Cl. D12-146.000.
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Hardy, Terence, to L. B. Plastics Limited. Window component. 308,104, 5-22-90, Cl. D25-124.000.
Hardy, Terence, to L. B. Plastics Limited. Window component. 308,105, 5-22-90, Cl. D25-124.000.
Hardy, Terence, to L. B. Plastics Limited. Window component. 308,106, 5-22-90, Cl. D25-124.000.
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Hengesbach, Robert W. Combined handle-operated flow control valve and pressure gauge. 308,094, 5-22-90, Cl. D23-226.000.
Hill, Loran R.; and Spangler, Anthony G., to Masco Corporation of Indiana. Hand held spray. 308,093, 5-22-90, Cl. D23-226.000.
Hiseh, Jimmy. Workpiece clamp for flat bed jig. 308,064, 5-22-90, Cl. D15-138.000.
Hoff, Phyllis J. Storage chest or similar article. 307,985, 5-22-90, Cl. D6-440.000.
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Huckenbeck, Claus O. Pair of binoculars. 308,066, 5-22-90, Cl. D16-133.000.
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Janzer, Thomas F., to Janzer Corp., The. Mailbox. 308,124, 5-22-90, Cl. D99-30.000.
Jimenez, Louis M. Catheter bag support hook or similar article. 308,099, 5-22-90, Cl. D24-54.000.
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Kanemitsu, Masahiro, to Kabushiki Kaisha Kanemitsu. Poly-V pulley with axially displaced hub. 308,013, 5-22-90, Cl. D8-360.000.
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Kittle, Christopher; Holt, James R.; and Schumacher, James H., to Reebok International Ltd. Shoe outsole. 307,975, 5-22-90, Cl. D2-320.000.
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Peart, Stephen, to Apple Computer, Inc. Video display for computer. 308,054, 5-22-90, Cl. D14-113.000.
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Reebok International Ltd.: *See*—
Kittle, Christopher; Holt, James R.; and Schumacher, James H., 307,975, Cl. D2-320.000.
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Slany, Hans E.; and Renner, Reinhard, 308,000, Cl. D7-360.000.
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Nakamura, Yoko, 308,073, Cl. D18-43.000.
Robbins, Daniel T. Handle for manual release of a paper roll spindle. 308,006, 5-22-90, Cl. D8-14.000.
Rodd, Timothy J.: *See*—
Aderman, Wayne L.; Garmon, Vincent S.; Rodd, Timothy J.; and Tennant, Robert P., 308,047, Cl. D14-100.000.
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Kunesh, Edward J., 308,024, Cl. D9-403.000.
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Salmonson, Duane L., to Micro Peripherals, Inc. Printer. 308,072, 5-22-90, Cl. D18-13.000.
Sanders, Ronald J. Sight aiming instrument for weaponry. 308,089, 5-22-90, Cl. D22-109.000.
Sasamura, Ross, to Paccar Inc. Headlight for a truck. 308,108, 5-22-90, Cl. D26-35.000.
Saunders, Jolyon, to Libman Broom Company. Combined push broom head and scraper. 307,981, 5-22-90, Cl. D4-118.000.
Sazerac Co., Inc.: *See*—
Newfield, Gail F., 307,988, Cl. D6-450.000.
Schering Corporation: *See*—
Bishop, Keith A.; and Blake, William S., 308,100, Cl. D24-62.000.

Schumacher, James H.: *See*—
Kittle, Christopher; Holt, James R.; and Schumacher, James H., 307,975, Cl. D2-320.000.
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Sakai, Hiroaki, 308,051, Cl. D14-106.000.
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Choi, Hoi, 307,983, Cl. D6-334.000.
Culler, Randy, 307,984, Cl. D6-334.000.
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Smith, William M.: *See*—
Smith, Melanie M.; and Smith, William M., 308,084, Cl. D21-157.000.
Sony Corporation: *See*—
Takeda, Yuka, 308,056, Cl. D14-121.000.
Sottsass, Ettore, to Ing. C. Olivetti & C., S.p.A. Personal computer. 308,048, 5-22-90, Cl. D14-100.000.
Spangler, Anthony G.: *See*—
Hill, Loran R.; and Spangler, Anthony G., 308,093, Cl. D23-226.000.
Sprague, James D. Fish hook remover. 308,091, 5-22-90, Cl. D22-149.000.
Stewart, Janet L. Earring display stand. 307,989, 5-22-90, Cl. D6-467.000.
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Sunila, Timo: *See*—
Linden, Erkki O.; and Sunila, Timo, 308,018, Cl. D8-93.000.
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Targetti, Giampaolo, 308,112, Cl. D26-72.000.
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Tennant, Robert P.: *See*—
Aderman, Wayne L.; Garmon, Vincent S.; Rodd, Timothy J.; and Tennant, Robert P., 308,047, Cl. D14-100.000.
Third R.W.M., Inc.: *See*—
McMahon, Robert W., 308,097, Cl. D25-1.000.
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Tomasi, Philip J.: *See*—
Darden, Julius C.; Praca, Miguel M. L.; and Tomasi, Philip J., 308,052, Cl. D14-109.000.
Tritton, Gary E.; and Tritton, Victor R., to Les Entreprises Tritton Ltee. Seal. 308,016, 5-22-90, Cl. D8-394.000.
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Astley, Graham J.; and Turner, Barry S., 308,123, Cl. D32-4.000.
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Davidson, Grant M. N., 308,060, Cl. D14-218.000.
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Vought, Kenneth D.: *See*—
Mueller, Hans W.; and Vought, Kenneth D., 308,070, Cl. D18-12.000.
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Tedham, Thomas A.; and Akagi, Kenichi, 308,055, Cl. D14-114.000.
Wannius, Ann-Charlotte, to Larstrade Intl. AB. Riding-boot. 307,973, 5-22-90, Cl. D2-274.000.
Warkentin, William P. Greeting card. 308,074, 5-22-90, Cl. D19-1.000.
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Issard, Gerard, 308,014, Cl. D8-367.000.
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Dinand, Ateliers, 308,023, Cl. D9-377.000.
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CLASSIFICATION OF PATENTS

ISSUED MAY 22, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

22	4,926,501
44	4,926,502
267	4,926,503

CLASS 4

247	4,926,504
	4,926,505
	4,926,506
295	4,926,507
329	4,926,508
448	4,926,509
542	4,926,510
605	4,926,511

CLASS 5

417	4,926,512
488	4,926,513

CLASS 8

150	4,926,514
583	4,927,429

CLASS 15

4	4,926,515
49 C	4,926,516
82	4,926,517
104.33	4,926,518
235.4	4,926,519
302	4,926,520

CLASS 16

110 A	4,926,521
114 R	4,926,522
125	4,926,523
386	4,926,524

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11 F	4,926,525
30.5 R	4,926,526
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640	4,926,528

CLASS 26

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CLASS 28

111	4,926,530
173	4,926,531

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25.35	4,926,532
33 F	4,926,533
238	4,926,536
275	4,926,537
559	4,926,538
568	4,926,539
596	4,926,540
598	4,926,541
619	4,926,542
623	4,926,543
703	4,926,544
832	4,926,545
840	4,926,546
841	4,926,547
860	4,926,548
876	4,926,549
888.451	4,926,534
890.144	4,926,535

CLASS 30

43.1	4,926,550
43.92	4,926,551
	4,926,552
49	4,926,553
161	4,926,554
162	4,926,555
216	4,926,556
276	4,926,557
308.1	4,926,558

CLASS 33

244	4,926,560
293	4,926,561
	4,926,563
414	4,926,562
474	4,926,564
567	4,926,565
771	4,926,566
832	4,926,559

CLASS 34

23	4,926,567

CLASS 36

15	4,926,568
43	4,926,570
91	4,926,569

CLASS 37

72	4,926,571

CLASS 40

448	4,926,572
663	4,926,573

CLASS 42

70.04	4,926,574
70.06	4,926,575
101	4,926,576

CLASS 43

42	4,926,577
42.24	4,926,578
42.44	4,926,579
44.89	4,926,580
61	4,926,581

CLASS 44

62	4,926,582

CLASS 47

1.01	4,926,583
52	4,926,597
59	4,926,584
61	4,926,598
64	4,926,585
66	4,926,586
85	4,926,587

CLASS 48

197 R	4,927,430

CLASS 49

88	4,926,599
491	4,926,600

CLASS 51

7	4,926,601
135 R	4,926,602
165.77	4,926,603
165.88	4,926,604
217 T	4,926,588
298	4,927,431
	4,927,432
427	4,926,589

CLASS 52

8	4,926,590
63	4,926,591
	4,926,605
98	4,926,592
126.4	4,926,593
200	4,926,594
263	Re.33,220
300	4,926,595
408	4,926,596
484	4,926,606
	4,926,607
522	4,926,608
582	4,926,609
716	4,926,610
748	4,926,611

CLASS 53

69	4,926,612
433	4,926,613
434	4,926,614
564	4,926,615
585	4,926,616
587	4,926,617

CLASS 55

18	4,927,433
20	4,926,618
	4,927,434
89	4,926,620
96	4,927,435
281	4,927,436
349	4,927,437
385.1	4,927,439
385.2	4,927,438

CLASS 56

6	4,926,621
12.8	4,927,440
15.4	4,926,619
16.8	4,926,622
60	4,926,623
202	4,926,624
376	4,926,625

CLASS 57

18	4,926,626
412	4,926,627

CLASS 60

39.142	4,926,631
39.15	4,926,628
39.281	4,926,629
39.36	4,926,630
203.1	4,926,632
226.1	4,926,633
274	4,926,634
299	4,926,635
312	4,926,636
317	4,926,637
319	4,926,638
522	4,926,639
602	4,926,640
605.3	4,926,641
607	4,926,642
691	4,926,643
715	4,926,644
723	4,926,645

CLASS 62

28	4,927,441
51.1	4,926,646
	4,926,647
55.5	4,926,648
99	4,926,649
114	4,926,650
133	4,926,651
175	4,926,652
204	4,926,653
229	4,926,654
244	4,926,655
310	4,926,656
311	4,926,657
324.1	4,926,658
476	4,926,659

CLASS 65

11.1	4,927,445
18.1	4,927,442
273	4,927,443
323	4,927,444
347	4,927,446

CLASS 66

9 R	4,926,660

CLASS 68

200	4,926,661

CLASS 70

56	4,926,662
74	4,926,663
119	4,926,664
277	4,926,665
374	4,926,670

CLASS 71

27	4,927,447
64.13	4,927,455
90	4,927,448
	4,927,449
91	4,927,450
92	4,927,451
	4,927,452
	4,927,453
93	4,927,454

CLASS 72

247	4,926,666
256	4,926,667
289	4,926,668
349	4,926,669
389	4,926,671
	4,926,676
410	4,926,685
430	4,926,677
458	4,926,672
465	4,926,673

CLASS 73

3	4,926,678
4 R	4,926,674
19	4,926,675
28	4,926,679
46	4,926,680
52	4,926,681
54	4,926,682
118.1	4,926,683
147	4,926,684
151	4,926,686
161	4,926,687
205	4,926,696
497	4,926,689
514	4,926,690
579	4,926,691
597	4,926,692
	4,926,693
794	4,926,694
861.24	4,926,695
861.48	4,926,697
861.61	4,926,698
862.21	4,926,699
862.23	4,926,700
864.15	4,926,701
864.83	4,926,702
865.1	4,926,703
866.5	4,926,704

CLASS 74

6	4,926,705
7 A	4,926,706
96	4,926,707
337.5	4,926,714
424.8 C	4,926,708
424.88	4,926,709
527	4,926,688
573 R	4,926,710
866	4,926,716

CLASS 75

10.14	4,927,460
10.63	4,927,457
246	4,927,458
254	4,927,461
346	4,927,456
685	4,927,459

CLASS 81

3.2	4,926,717
44	4,926,718
57.37	4,926,719
61	4,926,720
177.4	4,926,721
487	4,926,722

CLASS 82

118	4,926,723

CLASS 83

35	4,926,724
155	4,926,725
165	4,926,726
203	4,926,727
251	4,926,728
364	4,926,729
499	4,926,730
789	4,926,731
819	4,926,733

CLASS 84

318	4,926,732
423 R	4,926,734
453	4,926,735
609	4,926,736
611	4,926,737
618	4,926,738

CLASS 89

1.4	4,926,739
1.819	4,926,740
8	4,926,741
33.02	4,926,742
40.14	4,926,743

CLASS 92

58	4,926,744
256	4,926,745

CLASS 98

115.2	4,926,746

CLASS 99

486	4,926,747

CLASS 100

34	4,926,748
177	4,926,749

CLASS 102

261	4,926,750
348	4,926,751
486	4,926,752

CLASS 104

88	4,926,753
112	4,926,754
183	4,926,755

CLASS 105

167	4,926,756
224.1	4,926,757

CLASS 106

99	4,927,462
109	4,927,463
436	4,927,464
486	4,927,465
494	4,927,466

CLASS 108

43	4,926,758
111	4,926,759
145	4,926,760

CLASS 109

49.5	4,926,761
51	4,926,762

CLASS 110

215	4,926,763
221	4,926,764
234	4,926,765
342	4,926,766

CLASS 111

11	4,926,768
187	4,926,767

CLASS 112

121.12	4,926,769
453	4,926,770

CLASS 114

39.2	4,926,772
61	4,926,771
	4,926,773
123	4,926,774
222	4,926,775
263	4,926,776
270	4,926,777
273	4,926,778
297	4,926,779
311	4,926,780
351	4,926,781
361	4,926,782
363	4,926,783

CLASS 116

209	4,926,785
324	4,926,786

CLASS 118

32	4,926,787
500	4,926,788
653	4,926,790
668	4,926,789
723	4,926,791
729	4,926,792
730	4,926,793

CLASS 119

1	4,926,794
3	4,926,795
83	4,926,796
106	4,926,784

CLASS 122

15	4,926,797
24	4,926,798
235 A	4,926,799

CLASS 123

41.42	4,926,800
41.84	4,926,801
52 M	4,926,802
55 R	4,926,803
90.16	4,926,804
90.61	4,926,805
179 BG	4,926,807
179 L	4,926,806
187.5 R	4,926,808
190 A	4,926,809
192 B	4,926,810
193 H	4,926,812
193 P	4,926,811
195 HC	4,926,813
196 W	4,926,814
198 DB	4,926,815
203	4,926,816
292	4,926,817
297	4,926,818
	4,926,819
399	4,926,821
414	4,926,822
432	4,926,823
450	4,926,824
489	4,926,825
	4,926,826
	4,926,827
	4,926,828
497	4,926,829
557	4,926,830
	4,926,831

CLASS 124

23.1	4,926,833
25	4,926,834
25.6	4,926,832
35.2	4,926,835

CLASS 125

11.01	4,926,836

CLASS 126

21 H	4,926,837
25 A	4,926,838
96	4,926,839
110 R	4,926,840
243	4,926,841
360 R	4,926,842
390	4,926,843

CLASS 128

24 A	4,926,857
	4,926,859
30	4,926,844
75	4,926,849
78	4,926,845
80 H	4,926,846
155	4,926,850
157	4,926,851
169	4,926,848
200.23	4,926,852
201.18	4,926,853
201.23	4,926,854
201.28	4,926,855
203.26	4,926,856
395	4,926,861
419 PG	4,926,863
421	4,926,864
	4,926,865
630	4,926,866
633	4,926,867
653 R	4,926,868
654	4,926,869
660.01	4,926,870
660.07	4,926,871
661.01	4,926,872
681	4,926,873
682	4,926,874
691	4,926,875
731	4,926,969
736	4,926,876
754	4,926,877
798	4,926,878
	4,926,879
800	4,926,880
804	4,926,881
850	4,926,882
888	4,926,883
892	4,926,884
898	4,926,885

CLASS 131

84.4	4,926,886
91	4,926,887
236	4,926,888
329	4,926,889

CLASS 132

73	4,926,890
214	4,926,891
323	4,926,820

CLASS 135

103	4,926,892
106	4,926,893

CLASS 137

15 4,926,894
4,926,895
82 4,926,896
98 4,926,897
315 4,926,898
364 4,926,899
385 4,926,900
456 4,926,901
493.3 4,926,902
554 4,926,903
565 4,926,904
625.3 4,926,906
625.6 4,926,905
627.5 4,926,907
846 4,926,908

CLASS 138

109 4,926,909

CLASS 139

425 R 4,926,910
435.1 4,926,911
452 4,926,912

CLASS 141

1 4,926,913
59 4,926,914
290 4,926,915

CLASS 144

136 R 4,926,916
356 4,926,917

CLASS 148

3 4,927,467
4,927,468
11.5 A 4,927,469
12.7 A 4,927,470
33.5 4,927,471
261 4,927,472
306 4,927,473

CLASS 152

154 4,926,918
209 R 4,926,919
548 4,926,920

CLASS 156

66 4,927,474
89 4,927,475
173 4,927,476
182 4,927,477
185 4,927,478
228 4,927,479
4,927,480
243 4,927,482
245 4,927,481
306.6 4,927,483
345 4,927,484
4,927,485
351 4,927,486
4,927,487
460 4,927,488
620.1 4,927,489
630 4,927,491
634 4,927,490
642 4,927,492
643 4,927,493

CLASS 159

2.1 4,927,494

CLASS 160

115 4,926,921
331 4,926,922

CLASS 162

135 4,927,495
136 4,927,496
160 4,927,497
168.3 4,927,498
336 4,927,499

CLASS 164

5 4,926,923
4,926,924
154 4,926,925
312 4,926,926
429 4,926,927
445 4,926,929
452 4,926,928
476 4,926,930

CLASS 165

111 4,926,931
4,926,932
173 4,926,933
4,926,934
185 4,926,935

CLASS 166

206 4,926,937
208 4,926,938
4,926,939
217 4,926,936
247 4,926,940
248 4,926,941
250 4,926,942
270 4,926,943
293 4,926,944
321 4,926,945

CLASS 169

37 4,926,946

CLASS 172

4.5 4,926,948
22 4,926,947

CLASS 174

50 4,927,982
92 4,927,984
125.1 4,927,985
258 4,927,983

CLASS 175

17 4,926,949
39 4,926,950

CLASS 177

144 4,926,951

CLASS 178

18 4,927,986

CLASS 180

6.5 4,926,952
68.5 4,926,953
79.1 4,926,960
140 4,926,954
4,926,955
142 4,926,956
164 4,926,957
168 4,926,958
315 4,926,959

CLASS 181

22 4,926,961
150 4,926,962
250 4,926,963

CLASS 182

22 4,926,964
89 4,926,965
155 4,926,966
164 4,926,967
172 4,926,968

CLASS 184

6.11 4,926,970
15.1 4,926,971
109 4,926,972

CLASS 187

11 4,926,973
52 LC 4,926,974
57 4,926,975
108 4,928,021
125 4,926,976

CLASS 188

18 A 4,926,977
73.1 4,926,978
73.44 4,926,979
79.55 4,926,980
111 4,926,981
271 4,926,982
299 4,926,983
310 4,926,984
378 4,926,985

CLASS 192

0.02 R 4,926,986
3.3 4,926,988
8 C 4,926,987
18 A 4,926,989
28 4,926,990
41 S 4,926,991
48.2 4,926,992
98 4,926,993
110 R 4,926,994

CLASS 193

37 4,926,995

CLASS 194

212 4,926,996
231 4,926,997
315 4,926,998

CLASS 196

46 4,927,500

CLASS 198

358 4,926,999
418.4 4,927,000
463.5 4,927,001
487.1 4,927,002
497 4,927,003
704 4,927,004
781 4,927,005
822 4,927,006
823 4,927,007

CLASS 200

5 R 4,927,987
80 R 4,927,988
265 4,927,989
517 4,927,990

CLASS 202

248 4,927,501

CLASS 204

23 4,927,504
34.5 4,927,505
51 4,927,506
78 4,927,507
79 4,927,508
83 4,927,509
114 4,927,510
151 4,927,511
153.1 4,927,502
153.11 4,927,503
157.5 4,927,512
192.13 4,927,513
290 R 4,927,514
298.21 4,927,515
403 4,927,516
406 4,927,517
421 4,927,518

CLASS 206

45.31 4,927,008
188 4,927,009
204 4,927,010
217 4,927,011
219 4,927,012
221 4,927,013
287.1 4,927,014
315.11 4,927,016
315.9 4,927,015
316.2 4,927,017
365 4,927,018
4,927,019
373 4,927,021
378 4,927,020
443 4,927,022
523 4,927,023
562 4,927,024
575 4,927,025
600 4,927,026
611 4,927,027
618 4,927,028

CLASS 208

48 AA 4,927,519
50 4,927,520
65 4,927,521
120 4,927,522
4,927,523
131 4,927,524
138 4,927,525
152 4,927,526
161 4,927,527

CLASS 209

240 4,927,528
270 4,927,529
315 4,927,534
538 4,927,029
620 4,927,030
657 4,927,031

CLASS 210

149 4,927,530
198.2 4,927,531
4,927,532
257.1 4,927,533
500.23 4,927,535
512.2 4,927,536
527 4,927,537
634 4,927,538
635 4,927,539
638 4,927,540
656 4,927,541
711 4,927,542
4,927,543
712 4,927,544
745 4,927,545
755 4,927,546
771 4,927,547

CLASS 211

41 4,927,032
4,927,033

CLASS 212

218 4,927,034

CLASS 213

77 4,927,035

CLASS 215

203 4,927,036

CLASS 219

10.55 E 4,927,991
121.65 4,927,992
201 4,927,993
343 4,927,994
385 4,927,995
413 4,927,996
459 4,927,997
494 4,927,998
535 4,927,999

CLASS 220

1.5 4,927,037
3 4,927,038
3.7 4,927,039
5 R 4,927,040
20 4,927,041
23.83 4,927,042
67 4,927,043
83 4,927,044
88 R 4,927,045
90 4,927,046
90.2 4,927,047
4,927,048
201 4,927,049
445 4,927,050

CLASS 221

12 4,927,051
64 4,927,052
67 4,927,055
279 4,927,053
289 4,927,054

CLASS 222

1 4,927,056
5 4,927,057
106 4,927,058
136 4,927,059
146.5 4,927,060
212 4,927,061
420 4,927,062
520 4,927,065

CLASS 223

84 4,927,063

CLASS 224

42.45 R 4,927,066

CLASS 225

106 4,927,064

CLASS 227

128 4,927,067

CLASS 228

103 4,927,068
123 4,927,069
155 4,927,070

CLASS 229

71 4,927,071
92.3 4,927,072
117.07 4,927,073
125.21 4,927,074
125.34 4,927,075
132 4,927,076

CLASS 235

380 4,928,000
4,928,001
479 4,928,002

CLASS 237

2 A 4,927,077

CLASS 238

349 4,927,078

CLASS 239

11 4,927,079
77 4,927,080
223 4,927,081
230 4,927,082
282 4,927,083
584 4,927,084

CLASS 241

36 4,927,085
80 4,927,086
100.5 4,927,087
223 4,927,088
264 4,927,089

CLASS 242

67.1 R 4,927,090
68.4 4,927,091
107.2 4,927,092
154 4,927,093
242 4,927,094
261 4,927,095

CLASS 244

3.22 4,927,096
118.1 4,927,097
137.2 4,927,098
152 4,927,099
153 R 4,927,100
164 4,927,101

CLASS 246

469 4,927,102

CLASS 248

62 4,927,103
97 4,927,104
146 4,927,106
188.1 4,927,105
240.4 4,927,107
311.2 4,927,108
354.3 4,927,109
430 4,927,110
500 4,927,111
539 4,927,117
545 4,927,118
550 4,927,119
676 4,927,120

CLASS 250

201.1 4,928,006
211 J 4,928,003
227.14 4,928,004
227.23 4,928,005
231.1 4,928,008
231.13 4,928,009
310 4,928,010
327.2 4,928,011
338.1 4,928,012
339 4,928,013
341 4,928,014
343 4,928,015
440.1 4,928,016
483.1 4,928,017
492.2 4,928,018
561 4,928,019

CLASS 251

1.3 4,927,112
7 Re.33,219
165 4,927,113
240 4,927,114
241 4,927,115
312 4,927,116

CLASS 252

17 4,927,548
25 4,927,549
32.5 4,927,550
42.7 4,927,551
47 4,927,552
49.6 4,927,553
51.5 A 4,927,562
68 4,927,554
99 4,927,555
173 4,927,556
174.12 4,927,558
174.15 4,927,557
186.39 4,927,559
315.1 4,927,560
389.22 4,927,561
551 4,927,563
628 4,927,564

CLASS 260

404.5 4,927,565
412 4,927,566

CLASS 261

35 4,927,567
36.1 4,927,568
79.2 4,927,569

CLASS 264

1.4 4,927,570
4.3 4,927,571
22 4,927,572
40.1 4,927,573
40.6 4,927,574
46.4 4,927,575
49 4,927,576
63 4,927,577
81 4,927,578
101 4,927,579
102 4,927,580
108 4,927,581
113 4,927,582
136 4,927,583
154 4,927,584
171 4,927,585
185 4,927,586
211 4,927,587
258 4,927,588
259 4,927,589
272.17 4,927,590
532 4,927,591

CLASS 267

47 4,927,121
140.1 4,927,122
4,927,123
229 4,927,124

CLASS 269

60 4,927,126
74 4,927,125
322 4,927,127
4,927,128

CLASS 270

60 4,927,129

CLASS 271

10 4,927,130
215 4,927,131
225 4,927,132
4,927,133

CLASS 272

3 4,927,134
63 4,927,135
69 4,927,136
70 4,927,138
70.1 4,927,137
123 Re.33,218
144 4,927,139

CLASS 273

4 R 4,927,140
29 BB 4,927,142
58 K 4,927,141
73 D 4,927,143
80 A 4,927,144
94 4,927,145
146 4,927,147
148 R 4,927,148
150 4,927,146
4,927,149
153 S 4,927,150
162 B 4,927,151
186 R 4,927,152
187 R 4,927,153
200 R 4,927,154
255 4,927,155
256 4,927,156
260 4,927,157
268 4,927,158
338 4,927,159
371 4,927,160
402 4,927,161
408 4,927,162

CLASS 277

23 4,927,163
80 4,927,164

CLASS 280

43.23 4,927,165
91 4,927,166
250.1 4,927,167
615 4,927,168
661 4,927,169
707 4,927,170
718 4,927,171
734 4,927,172
755 4,927,173
777 4,927,174
806 4,927,175
813 4,927,176
851 4,927,177

CLASS 283

38 4,927,178
70 4,927,180
79 4,927,179

CLASS 285

15 4,927,181
4,927,182
21 4,927,183
4,927,184
39 4,927,185
54 4,927,186
80 4,927,187
89 4,927,188
109 4,927,189
175 4,927,190
226 4,927,191
305 4,927,192

CLASS 292

92 4,927,193
128 4,927,194
169.14 4,927,195
201 4,927,196
4,927,203
216 4,927,204
245 4,927,197
306 4,927,198
337 4,927,199

CLASS 294

94 4,927,205

CLASS 296

37.8 4,927,200
63 4,927,201
107 4,927,202
156 4,927,206
185 4,927,207
216 4,927,208

CLASS 297

180 4,927,209
366 4,927,210
465 4,927,211

CLASS 303

115 4,927,212
116 4,927,213

CLASS 307
106 4,928,020
241 4,928,022
443 4,928,023
455 4,928,024
4,928,025
479 4,928,026

CLASS 310
11 4,928,027
23 4,928,028
89 4,928,029
328 4,928,030
346 4,928,031

CLASS 312
4,927,214
224 4,927,215
339 4,927,216

CLASS 313
318 4,928,032
345 4,928,033
346 R 4,928,034
466 4,928,035

CLASS 315
82 4,928,036
127 4,928,037
209 R 4,928,038
4,928,039
248 4,927,217
4,928,040
366 4,927,218
4,928,041
371 4,927,219

CLASS 318
254 4,928,042
4,928,043
364 4,928,044
464 4,928,045
568.16 4,928,047
644 4,928,048
654 4,928,046
685 4,928,049
696 4,928,050
731 4,928,051
762 4,928,052

CLASS 323
284 4,928,053
288 4,928,054
300 4,928,055
314 4,928,056

CLASS 324
72 4,928,057
96 4,928,058
4,928,067
123 R 4,928,059
143 4,928,060
158 F 4,928,061
158 R 4,928,062
307 4,928,063
322 4,928,064
464 4,928,065
539 4,928,066

CLASS 329
324 4,928,068

CLASS 330
4.3 4,928,076
5.5 4,928,069
43 4,928,070
129 4,928,071
149 4,928,072
252 4,928,073
254 4,928,074

CLASS 331
17 4,928,075

CLASS 333
109 4,928,078
111 4,928,077

CLASS 335
13 4,928,079
202 4,928,080
216 4,928,081

CLASS 338
174 4,928,082
202 4,928,083

CLASS 340
479 4,928,084
544 4,928,085
575 4,928,090
686 4,928,091
707 4,928,092
709 4,928,093
712 4,928,094
784 4,928,095
825.280 4,928,099
825.440 4,928,086
4,928,096
4,928,100
825.500 4,928,097
825.56 4,928,098
825.71 4,928,087
854 4,928,088
870.31 4,928,089
943 4,928,101

CLASS 341
137 4,928,007
154 4,928,102
159 4,928,103

CLASS 342
9 4,928,130
15 4,928,104
188 4,928,131
192 4,928,105
352 4,928,106
357 4,928,107

CLASS 343
704 4,928,108
786 4,928,109

CLASS 344
1.1 4,928,110
4,928,111
25 4,928,112
75 4,928,113
4,928,114
4,928,115
4,928,116
76 PH 4,928,117
4,928,134
107 R 4,928,118
108 4,928,119
135.1 4,928,132
140 R 4,928,120
4,928,121
4,928,125
4,928,126
150 4,928,133
160 4,928,122
4,928,127
4,928,128
4,928,129

CLASS 350
3.64 4,927,220
96.14 4,927,221
96.15 4,927,222
4,927,223
4,927,224
96.18 4,927,225
96.20 4,927,227
4,927,228
4,928,135
96.21 4,927,229
96.24 4,927,230
96.29 4,927,232
96.32 4,927,231
128 4,927,233
130 4,927,238
165 4,927,239
174 4,927,234
252 4,927,235
276 R 4,927,236
319 4,927,237
335 4,927,240
336 4,927,241
346 4,927,242
350 S 4,927,243
4,927,244
354 4,927,245
357 4,927,246
432 4,927,247
452 4,927,248
486 4,927,249
500 4,927,250
503 4,927,251
4,927,252
507 4,927,254
508 4,927,253
616 4,927,255
619 4,927,256
631 4,927,257

CLASS 351
156 4,927,258
224 4,927,259
243 4,927,260

CLASS 352
39 4,927,261

CLASS 353
13 4,927,262
20 4,928,123

CLASS 354
106 4,928,124

CLASS 355
1 4,928,139
48 4,928,140
208 4,928,141
218 4,928,142
4,928,143
245 4,928,144
4,928,145
253 4,928,146
288 4,928,147
290 4,928,148
305 4,928,149
311 4,928,150
315 4,928,136
320 4,928,151

CLASS 356
5 4,927,263
4,928,152
41 4,927,264
73 4,927,265
243 4,927,266
336 4,927,267
4,927,268
343 4,928,153
346 4,927,269

CLASS 357
16 4,928,154
23.13 4,928,157
23.3 4,928,163
23.4 4,928,155
4,928,156
4,928,158
24 4,928,159
42 4,928,164
45 4,928,160
54 4,928,161
71 4,928,162
72 4,928,162

CLASS 358
36 4,928,165
4,928,166
80 4,928,167
84 4,928,168
93 4,928,169
94 4,928,170
97 4,928,171
98 4,928,172
102 4,928,173
108 4,928,174
4,928,175
126 4,928,176
142 4,928,177
160 4,928,178
210 4,928,179
213.13 4,928,180
213.26 4,928,137
230 4,928,181
245 4,928,182
296 4,928,183
335 4,928,184

CLASS 360
19.1 4,928,185
21 4,928,186
40 4,928,187
66 4,928,190
77.08 4,928,192
78.04 4,928,193
85 4,928,191
97.04 4,928,194
103 4,928,195
105 4,928,196
113 4,928,188
128 4,928,189
132 4,928,197

CLASS 361
1 4,928,198
56 4,928,199
93 4,928,200
215 4,928,201
4,928,202
280 4,928,203
331 4,928,204
346 4,928,205
385 4,928,206
4,928,207
395 4,928,208

CLASS 362
33 4,928,211
61 4,928,212
4,928,213
4,928,214
4,928,215
66 4,928,216
217 4,928,209
4,928,210
427 4,928,217

CLASS 363
37 4,928,218
40 4,928,138
54 4,928,219
56 4,928,220

CLASS 364
191 4,928,221
200 4,928,222
4,928,223
4,928,224
4,928,225
4,928,226
4,928,234
4,928,237
4,928,238
4,928,239
424.01 4,928,227
4,928,241
424.03 4,928,242
424.1 4,928,235
431.02 4,928,240
431.09 4,928,228
464.01 4,928,229
464.02 4,928,244
479 4,928,230
484 4,928,251
513 4,928,236
4,928,245
514 4,928,246
518 4,928,231
4,928,247
4,928,249
4,928,250
519 4,928,243
4,928,252
521 4,928,253
522 4,928,233
525 4,928,232
556 4,928,254
558 4,928,255
561 4,928,256
563 4,928,257
724.17 4,928,258
745 4,928,259

CLASS 365
49 4,928,260
104 4,928,261
189.01 4,928,265
4,928,266
218 4,928,267
230.03 4,928,268

CLASS 367
35 4,928,269
106 4,928,262
118 4,928,263
141 4,928,264

CLASS 368
82 4,928,270

CLASS 369
116 4,928,277
292 4,928,271

CLASS 370
50 4,928,272
85.7 4,928,273
92 4,928,274
102 4,928,275
110.1 4,928,276

CLASS 371
1 4,928,278
11.2 4,928,279
39.1 4,928,280
51.1 4,928,281

CLASS 372
18 4,928,282
31 4,928,284
38 4,928,248
45 4,928,285
90 4,928,286

CLASS 374
16 4,927,270

CLASS 375
13 4,928,287
17 4,928,288
20 4,928,289
118 4,928,290

CLASS 376
123 4,927,592
254 4,927,593
258 4,927,594
268 4,927,595
283 4,927,596
290 4,927,597
306 4,927,598
321 4,927,599
327 4,928,291

CLASS 378
17 4,928,292
20 4,928,283
50 4,928,293
74 4,928,294
104 4,928,295
141 4,928,296
146 4,928,297
162 4,928,298

CLASS 379
37 4,928,299
53 4,928,300
4,928,301
88 4,928,302
93 4,928,303
94 4,928,304
98 4,928,305
201 4,928,306
395 4,928,307
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4,928,061	4,928,181	4,926,871	4,928,094	4,926,814	4,927,582
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DESIGN PATENTS

01 : 307,976	308,054	308,086	308,038	308,002	308,102
06 : 307,971	308,066	308,098	25 : 307,975	308,022	308,120
307,974	308,067	13 : 307,987	308,055	308,082	42 : 308,003
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307,979	308,099	17 : 307,992	26 : 307,982	308,113	308,124
307,985	308,108	308,069	308,005	36 : 307,970	43 : 308,031
307,989	308,109	308,092	308,015	308,019	48 : 307,998
307,990	308,116	308,111	308,030	308,020	308,011
307,996	08 : 308,044	18 : 308,093	308,062	308,061	308,033
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308,006	308,122	308,096	27 : 307,991	308,078	308,045
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308,042	12 : 307,980	308,103	29 : 308,025	39 : 308,081	308,026
308,052	307,986	21 : 308,083	32 : 308,079	308,088	308,119
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06 : 7,234	7,235				

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